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Velinda D. Lillard

## OXAZOLIDINONE COMBINATORIAL LIBRARIES, COMPOSITIONS AND METHODS OF PREPARATION

### CROSS REFERENCE TO RELATED APPLICATIONS

sub 1  
This application is a continuation in part of U.S. Patent Application Serial No. 09/012,535, filed January 23, 1998, and a continuation in part of U.S. Patent Application Serial No. 09/086,702, filed May 28, 1998, the disclosures of which are incorporated herein by reference in their entirety.

### FIELD OF THE INVENTION

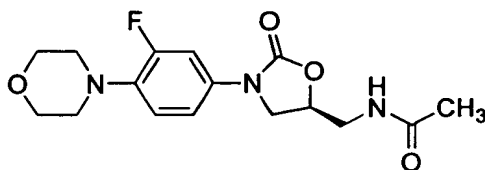
The present invention is directed to oxazolidinones; oxazolidinone compositions; oxazolidinone combinational libraries; and methods for their preparation and use.

### BACKGROUND ART

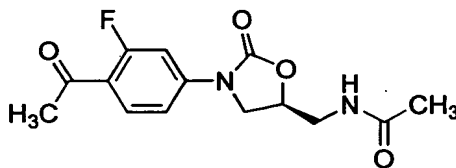
Oxazolidinones are compounds where an amine group and a hydroxyl group on adjacent carbon atoms have been cyclized to form a 5-membered ring containing a carbonyl group. Certain oxazolidinones have been shown to exhibit a variety of biological activities. For example, some oxazolidinones are inhibitors of monoamine oxidase-B, an enzyme implicated in Parkinson's disease. See, for example, Ding *et al.*, *J. Med. Chem.* 36:3606-3610 (1993).

A ten step synthesis of oxazolidinone antibiotics has been described. U.S. Patent No. 5,547,950. A four step synthesis of the antibacterial compound U-100592 also has been reported. Schauss *et al.*, *Tetrahedron Letters*, 37:7937-7940 (1996). A five step preparation of enantiomerically pure *cis*- and *trans*-N-(propionyl)hexahydrobenzoxazolidin-2-ones further was reported. De Parrodi *et al.*, *Tetrahedron: Asymmetry*, 8:1075-1082 (1997).

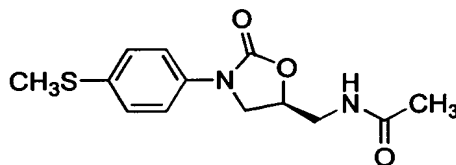
Scientists have reported that certain oxazolidinone derivatives exhibit beneficial antibacterial effects. For instance, N-[3-[3-fluoro-4-(morpholin-4-yl)phenyl]2-oxooxazolidin-5(s)-ylmethyl] acetamide (below) has been reported to be useful for the treatment of bacterial infections. Lizondo *et al.*, *Drugs of the Future*, 21:1116-1123 (1996).



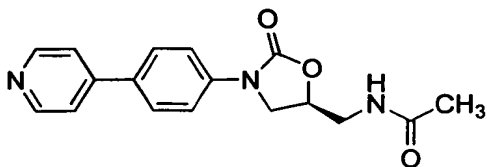
The synthesis of the oxazolidinone antibacterial agent shown below has been reported. Wang *et al.*, *Tetrahedron*, 45:1323-1326 (1989). This oxazolidinone was made using a process that included the reaction of an aniline with glycidol to provide an amino alcohol, and the diethylcarbonate mediated cyclization of the amino alcohol to afford an oxazolidinone.



The synthesis of oxazolidinone antibacterial agents, including the compound shown below has been reported. U.S. Pat. No. 4,705,799. The process used to make the compound shown below included a metal mediated reduction of a sulfonyl chloride to provide a sulfide.



The synthesis of oxazolidinone antibacterial agents, including the pyridyl compound shown below has been reported. U.S. Patent No. 4,948,801. The process used included an organometallic mediated coupling of an organotin compound and an aryl iodide.



Synthetic routes to oxazolidinones often allow a chemist to produce only one compound at a time. These laborious methods can provide a limited number of compounds for evaluation in a biological screen. These methods cannot, however, provide the number of compounds required to supply a high-throughput biological screen, an assay technique whereby the activity of thousands of drug candidates, for example, per week, may be analyzed. This limitation on compound production is of practical importance since high-throughput screens are desirable and efficient for the discovery of new drugs.

#### SUMMARY OF INVENTION

Provided are oxazolidinones and combinatorial libraries, compositions comprising oxazolidinones, as well as methods of their synthesis and use. Using the methods provided herein, one of skill in the art can rapidly produce the large number of compounds required for high-throughput screening.

In one embodiment, provided are methods for the solid phase synthesis of oxazolidinones.

In one embodiment, the method comprises attaching an olefin to a solid support, oxidizing the olefin to provide an epoxide functionality, opening the epoxide with an amine and cyclizing the resulting amino alcohol using a phosgene equivalent.

In another embodiment, the method comprises attaching an allylic amine to a solid support, oxidizing the olefin of the allylic amine to provide an epoxide, opening the epoxide with an amine, and cyclizing the resulting amino alcohol using a phosgene equivalent.

In another embodiment, the method comprises attaching allylamine to a solid support, oxidizing the olefin of allylamine to provide an epoxide, opening

the epoxide with an amine and cyclizing the resulting amino alcohol using a phosgene equivalent.

5 In another embodiment, the method comprises attaching an olefin to a solid support, oxidizing the olefin to provide an epoxide, opening the epoxide with an amino acid and cyclizing the resulting amino alcohol using a phosgene equivalent.

10 In another embodiment, the method comprises attaching an olefin to a solid support, oxidizing the olefin to provide an epoxide, opening the epoxide with an aromatic amine and cyclizing the resulting amino alcohol using a phosgene equivalent.

Methods also are provided for the synthesis of oxazolidinone combinatorial libraries.

15 In one embodiment, the method comprises attaching an olefin group to an array of solid supports, oxidizing the individual olefin groups to provide an array of solid support bound epoxides, opening the epoxides with amine units, and cyclizing the resulting array of amino alcohols using a phosgene equivalent.

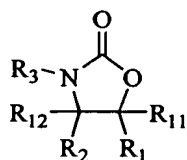
20 In another embodiment, the method comprises attaching an allylic amine to an array of solid supports, oxidizing the individual olefin groups to provide an array of solid support bound epoxides, opening the epoxides with amine units and cyclizing the resulting array of amino alcohols using a phosgene equivalent.

25 In another embodiment, the method comprises attaching allyl amine to an array of solid supports, oxidizing the individual olefin groups to provide an array of solid support bound epoxides, opening the epoxides with amine units and cyclizing the resulting array of amino alcohols using a phosgene equivalent.

30 In another embodiment, the method comprises attaching an olefin to an array of solid supports, oxidizing the individual olefin groups to provide an array of solid support bound epoxides, opening the epoxides with amino acid units and cyclizing the resulting array of amino alcohols using a phosgene equivalent.

In another embodiment, the method comprises attaching an olefin to an array of solid supports, oxidizing the individual olefin groups to provide an array of solid support bound epoxides, opening the epoxides with aromatic amine units and cyclizing the resulting array of amino alcohols using a phosgene equivalent.

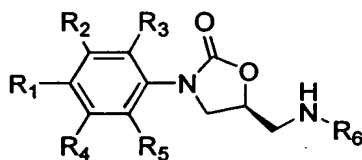
Provided are a variety of oxazolidinones and combinatorial libraries thereof. In one embodiment, the oxazolidinones have the structure:



**1a**

where  $R_1$  is selected from the group consisting of alkyl, heteroalkyl aryl and heteroaryl;  $R_2$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl; aryl and heteroaryl;  $R_3$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl;  $R_{11}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl; and  $R_{12}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl.

In another embodiment, oxazolidinones and combinatorial libraries are provided wherein the oxazolidinones are of the structure **1b**, wherein  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl,



**1b**

heteroalkyl, heteroaryl or an electron withdrawing group;  $R_6$  is acyl or sulfonyl; and,  $R_1$  is one of the following functional groups:  $C(O)NR_7R_8$ , wherein  $R_7$  and  $R_8$  are, independently, hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $C(O)OR_9$ , wherein  $R_9$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $C(O)R_{10}$ , wherein  $R_{10}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $SR_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)_2R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $NR_{12}R_{13}$ , wherein  $R_{12}$  and  $R_{13}$  are,

independently, hydrogen, acyl, sulfonyl, alkyl, heteroalkyl, aryl or heteroaryl; 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position of the oxazolyl, and wherein  $R_{14}$  and  $R_{15}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position of the thiazole, and wherein  $R_{16}$  and  $R_{17}$ , are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; and,  $CH_2NR_{18}R_{19}$ , wherein  $R_{18}$  and  $R_{19}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, acyl or sulfonyl.

All compounds disclosed herein can exist as different isomer forms including stereoisomers and enantiomerically pure forms, and all such isomers and forms are within the scope of the invention. For example, while structure **1b** is shown with the preferred embodiment of a S isomer at the 5 position of the oxazolidinone, the R isomer is within the scope of the invention. Similarly, in all of the other oxazolidinone compounds, in the case where a preferred stereoisomer is shown at the 5 position of the oxazolidinone, both stereoisomers are within the scope of the invention.

In one embodiment of structure **1b**,  $R_1$  is  $C(O)R_7R_8$ .

In another embodiment of structure **1b**,  $R_1$  is  $C(O)OR_9$ .

In another embodiment of structure **1b**,  $R_1$  is  $C(O)R_{10}$ .

In another embodiment of structure **1b**,  $R_1$  is  $SR_{11}$ .

In another embodiment of structure **1b**,  $R_1$  is  $S(O)_2R_{11}$ .

In another embodiment of structure **1b**,  $R_1$  is  $S(O)R_{11}$ .

In another embodiment of structure **1b**,  $R_1$  is  $NR_{12}R_{13}$ . In another embodiment,  $R_1$  is  $NR_x(C=O)R_y$ , wherein  $R_x$  and  $R_y$  are independently hydrogen, alkyl, heteroalkyl, aryl, or heteroaryl;

or  $R_1$  is  $NR_x(SO_2)R_y$ , wherein  $R_x$  and  $R_y$  are independently hydrogen, alkyl, heteroalkyl, aryl, or heteroaryl with the proviso that  $R_y$  is not H;

In another embodiment of structure **1b**,  $R_1$  is 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position of the oxazole group.

In another embodiment of structure **1b**,  $R_1$  is 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position of the aminothiazolyl group.

In another embodiment of structure **1b**,  $R_1$  is  $CH_2NR_{18}R_{19}$ .

In another embodiment of structure **1b**,  $R_1$  is  $C(O)NR_7R_8$ ; and,  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen.

5 In another embodiment of structure **1b**,  $R_1$  is  $C(O)NR_7R_8$ ;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_2$  is fluorine.

In another embodiment of structure **1b**,  $R_1$  is  $C(O)NR_7R_8$ ;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen;  $R_2$  is fluorine; and,  $R_6$  is  $C(O)CH_3$ .

In another embodiment of structure **1b**,  $R_1$  is  $C(O)NR_7R_8$ ;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen;  $R_2$  is fluorine;  $R_6$  is  $C(O)CH_3$ ; and,  $R_7$  is hydrogen.

10 In another embodiment of structure **1b**,  $R_1$  is  $C(O)NR_7R_8$ ;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen;  $R_2$  is fluorine;  $R_6$  is  $C(O)CH_3$ ;  $R_7$  is hydrogen; and,  $R_8$  is heteroaryl.

A variety of methods of preparing combinatorial libraries comprising oxazolidinones are provided.

15 In one embodiment, the method is for the preparation of oxazolidinones, such as those of structure **1b**. The method comprises the steps of: attaching a plurality of aryl oxazolidinones to a plurality of solid supports; functionalizing the 4-position of the aryl groups of the attached oxazolidinones; and, optionally, removing the oxazolidinones from the solid supports.

20 In another embodiment, the aryl oxazolidinone is attached to a solid support through the reaction of an iminophosphorane with a carbonyl containing resin to form an imine. In another embodiment, the aryl oxazolidinone is attached to a solid support through the reaction of an amine with a carbonyl containing resin to form an imine.

25 In another embodiment, the aryl oxazolidinone is attached to a solid support through the reaction of an iminophosphorane with a carbonyl containing resin to form an imine, and the imine is reduced to form an amine. In another embodiment, the aryl oxazolidinone is attached to a solid support through the reaction of an amine with a carbonyl containing resin to form an imine, and the imine is reduced to form an amine.

30 Also provided are biologically active oxazolidinones and compositions comprising biologically active oxazolidinones. For example, the oxazolidinones may have antibiotic activity.

In one embodiment, the biologically active oxazolidinones are of the structure **1b**.

In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ .

5 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-oxazolyl containing  $R_{14}$  at the 4-position and  $R_{15}$  at the 5-position of the oxazole.

10 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-aminothiazolyl containing  $R_{16}$  at the 4-position and  $R_{17}$  at the 5-position of the aminothiazole.

In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ , and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen.

15 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-oxazolyl containing  $R_{14}$  at the 4-position and  $R_{15}$  at the 5-position of the oxazole, and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen.

20 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-aminothiazolyl containing  $R_{16}$  at the 4-position and  $R_{17}$  at the 5-position of the aminothiazole, and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen.

In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ , and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen, and further wherein  $R_2$  is fluorine.

25 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-oxazolyl containing  $R_{14}$  at the 4-position and  $R_{15}$  at the 5-position of the oxazole, and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen, and further wherein  $R_2$  is fluorine.

30 In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is 2-aminothiazolyl containing  $R_{16}$  at the 4-position and  $R_{17}$  at the 5-position of the aminothiazole, and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen, and further wherein  $R_2$  is fluorine.



In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is 5-chloropyridine-3-yl, thiazole-2-yl, 5'-(5-aminopyridine-2-yl)thiopyridine-3'-yl, or pyridine-3-yl; and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and further wherein  $R_2$  is fluorine; and further wherein  $R_6$  is  $C(O)CH_3$ .

In another embodiment, the biologically active oxazolidinones are of the structure **1b**, wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is 5-chloropyridine-3-yl; and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and further wherein  $R_2$  is fluorine; and further wherein  $R_6$  is  $C(O)CH_2SMe$ .

In another embodiment, the biologically active oxazolidinones are of the structure **1b** wherein  $R_1$  of the oxazolidinone is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is 5-chloropyridine-3-yl; and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and further wherein  $R_2$  is fluorine; and further wherein  $R_6$  is  $C(O)CHCH(\text{pyridine-3-yl})$ .

In another embodiment, the biologically active oxazolidinones are of the structure **1b** wherein  $R_1$  of the oxazolidinone is 5-amino-4-cyanooxazole-2-yl; and wherein  $R_2$  is fluorine; and further wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and still further wherein  $R_6$  is  $C(O)CH_3$ .

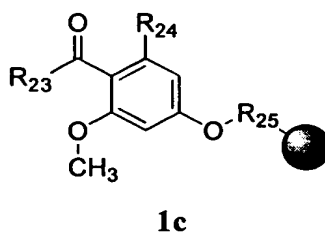
In another embodiment, the biologically active oxazolidinones are of the structure **1b** wherein  $R_1$  of the oxazolidinone is 4-phenylthiazole-2-yl-amino; and wherein  $R_2$  is fluorine; and further wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and still further wherein  $R_6$  is  $C(O)CH_3$ .

A variety of methods of synthesizing biologically active oxazolidinones are provided.

In one embodiment, methods are provided for the preparation of oxazolidinones, such as those of the structure **1b**, and comprise the steps of: providing an iminophosphorane; mixing the iminophosphorane with a resin that comprises carbonyl groups to form an imine intermediate; and, reducing the imine intermediate to afford a compound attached to the resin through an amine linkage. In another embodiment, the iminophosphorane is provided from an azide that is reacted with a phosphine. In another embodiment, the iminophosphorane is

provided from an amine that is reacted with a (trisubstituted)phosphine dihalide.

In another embodiment, the resin comprising carbonyl groups is of the structure



wherein  $R_{23}$  is hydrogen, alkyl, aryl, O-alkyl or O-aryl;  $R_{24}$  is hydrogen,  $\text{CH}_3\text{O}$  or  $\text{NO}_2$ ;  $R_{25}$  is  $(\text{CH}_2)_n\text{CONH}$ , wherein  $n$  is an integer ranging between 1 and about 5; and, the filled circle is a polymeric support.

In another embodiment of structure **1c**,  $R_{23}$  is hydrogen,  $R_{24}$  is  $\text{CH}_3\text{O}$ ,  $R_{25}$  is  $(\text{CH}_2)_3\text{CONH}$  and the filled circle is Tentagel, (cross-linked)polystyrene, (cross-linked)polyethylene glycol or polyethyleneglycol-polystyrene compositions.

Methods also are provided of synthesizing biologically active oxazolidinone compositions from a corresponding amine. In one embodiment, the method is for the preparation of oxazolidinones, for example, of the structure **1b**, and comprises the steps of: reacting an amine with a resin that comprises carbonyl groups to form an imine intermediate; and, reducing the imine intermediate to afford a compound attached to the resin through an amine linkage.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is shows the structure of an oxazolidinone **1b**.

Figure 2 is a scheme showing the synthesis of a combinatorial library comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $\text{C}(\text{O})\text{R}_7\text{R}_8$ .

Figure 3 is a scheme showing the synthesis of a set of azido oxazolidinones.

Figure 4 is a scheme showing the synthesis of a combinatorial library comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $\text{C}(\text{O})\text{R}_7\text{R}_8$ , and wherein  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and wherein in Figure 4, the N-Ac group of **17**, **18** and **19** also may be  $\text{NCOR}_1$ , wherein  $R_1$  is a substituent, such as H, alkyl,

heteroalkyl, aryl, or heteroaryl.

Figure 5 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $C(O)OR_9$  or  $C(O)R_{10}$ .

Figure 6 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $SR_{11}$ .

Figure 7 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $S(O)R_{11}$  or  $S(O)_2R_{11}$ .

Figure 8 is a scheme showing the synthesis of a set of thio substituted azido oxazolidinones.

Figure 9 is a scheme showing the synthesis of a combinatorial library comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $NR_{12}R_{13}$ .

Figure 10 is a scheme showing the synthesis of a combinatorial library comprising oxazolidinones of structure **1b**, wherein  $R_1$  is an oxazole.

Figure 11 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is an oxazole.

Figure 12 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is an aminothiazole.

Figure 13 is a scheme showing the synthesis of combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is  $CH_2NR_{18}R_{19}$ .

Figure 14 is a scheme showing the synthesis of a set of acetal containing azido oxazolidinones.

Figure 15 is a scheme showing a general synthetic method for the preparation of oxazolidinones.

Figure 16 is a scheme showing a general synthetic method for the preparation of azido oxazolidinones.

Figure 17 is a graphical depiction of a linking portion connecting an oxazolidinone to a solid support.

Figure 18 is a scheme showing the synthesis of an oxazolidinone of structure **1b**, wherein  $R_1$  is  $NR_{12}R_{13}$ .

Figure 19 is a scheme showing the synthesis of an oxazolidinone of structure **1b** wherein  $R_1$  is an aminothiazole.

Figure 20 is a scheme showing the synthesis of an oxazolidinone of

structure **1b**, wherein  $R_1$  is an oxazole.

Figure 21 is a scheme showing the synthesis of oxazolidinones of structure **1b** wherein  $R_1$  is  $C(O)R_{10}$ .

Figure 22 is a scheme showing the synthesis of oxazolidinones of structure **1b**, wherein  $R_1$  is  $NR_{12}R_{13}$ .

Figure 23 is a scheme showing a general synthetic method for the preparation of oxazolidinones.

Figure 24 is a scheme showing a method of preparation of N-[(3-phenyl-2-oxo-5-oxazolidinyl)methyl]acetamide.

Figure 25 is a scheme showing a method of preparation of N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]methyl]acetamide.

Figure 26 is a scheme showing a method of preparation for solid support bound (S)-N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]-methyl]acetamide.

Figure 27 is a scheme showing a method of preparation for sulfonyl, amidyl and ureayl derivatives of (S)-N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]-methyl]acetamide.

Figure 28 is a scheme showing the preparation of  $\alpha$ -thio acetamide,  $\alpha$ ,  $\beta$ -unsaturated acetamide and  $\alpha$ -amino acetamide derivatives of (S)-N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]-methyl]acetamide.

Figure 29 shows a nonlimiting group of amines that are used in the preparation of sulfonyl, amidyl and ureayl oxazolidinone combinatorial libraries.

Figure 30 shows another nonlimiting group of amines that are used in the preparation of sulfonyl, amidyl and ureayl oxazolidinone combinatorial libraries.

Figure 31 shows another nonlimiting group of amines that are used in the preparation of sulfonyl, amidyl and ureayl oxazolidinone combinatorial libraries.

Figure 32 shows a nonlimiting group of amines that are attached to a solid support in a manner analogous to amine **32a** in Figure 26 and then used to construct sulfonamide, amide and urea oxazolidinone libraries in a manner analogous to solid support bound amine **33a** in Figure 27.

Figure 33 is a group of amines for use in the preparation of oxazolidinones that was for example used to prepare combinatorial libraries

comprising oxazolidinones of structure **1b**, wherein  $R_1$  is derived from the shown amine,  $R_2$  is fluorine,  $R_3$  is hydrogen,  $R_4$  is hydrogen,  $R_5$  is hydrogen and  $R_6$  is  $C(O)CH_3$ .

Figure 34 is a group of amines for use in the preparation of oxazolidinones that was for example used to prepare combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is derived from the shown amine,  $R_2$  is fluorine,  $R_3$  is hydrogen,  $R_4$  is hydrogen,  $R_5$  is hydrogen and  $R_6$  is  $C(O)CH_3$ .

Figure 35 is a group of amines for use in the preparation of oxazolidinones that was for example used to prepare combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is derived from the shown amine,  $R_2$  is fluorine,  $R_3$  is hydrogen,  $R_4$  is hydrogen,  $R_5$  is hydrogen and  $R_6$  is  $C(O)CH_3$ .

Figure 36 is a group of amines for use in the preparation of oxazolidinones that was used for example to prepare combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is derived from the shown amine,  $R_2$  is fluorine,  $R_3$  is hydrogen,  $R_4$  is hydrogen,  $R_5$  is hydrogen and  $R_6$  is  $C(O)CHCHC_6H_4CH(p-NOCH_3)$  or  $C(O)CHCHC_6H_4(p-OCH_3)$ .

Figure 37 is a group of amines for use in the preparation of oxazolidinones that was used for example to prepare combinatorial libraries comprising oxazolidinones of structure **1b**, wherein  $R_1$  is derived from the shown amine,  $R_2$  is fluorine,  $R_3$  is hydrogen,  $R_4$  is hydrogen,  $R_5$  is hydrogen and  $R_6$  is  $C(O)CH_2SCH_3$  or  $C(O)CHCH(3-C_4H_9N)$ .

Figure 38 shows a group of biologically active oxazolidinone compounds, with an MIC range of about 1.25-20  $\mu\text{g/ml}$  against *E. faecium*.

Figure 39 is a scheme showing the synthesis of acylamino oxazolidinone compounds and libraries, wherein  $R_1$  and  $R_2$  are substituents, for example, H, alkyl, heteroalkyl, aryl, heteroaryl, or alkoxy.

Figure 40 is a scheme showing the synthesis of sulfonamide oxazolidinone compounds and libraries, wherein  $R_1$  is a substituent, for example, H, alkyl, heteroalkyl, aryl, heteroaryl, or alkoxy.

Figure 41 is a scheme showing the synthesis of sulfide oxazolidinone compounds and libraries, wherein  $R_1$  is a substituent, for example, H, alkyl, heteroalkyl, aryl, heteroaryl, or alkoxy.

Figures 42 and 43 illustrate building blocks  $R_2COOH$  that may be used for synthesis of acylamino oxazolidinone libraries and compounds as shown in Figure 39, and also may be used in other syntheses such as those shown in Figure 9.

Figures 44 and 45 illustrate building blocks  $R_2X$ , where X is halo, which may be used in the synthesis of sulfide oxazolidinone libraries and compounds as shown in Figure 41 and also can be used as  $R_{11}X$  in the synthesis shown in Figure 6.

Figure 46 illustrates sulfonyl chloride building blocks  $R_2SO_2Cl$  that may be used in the synthesis of sulfonamide oxazolidinone libraries and compounds as shown in Figure 40, and also may be used in the syntheses shown in Figure 18.

Figure 47 illustrates amine building blocks  $R_7R_8NH$  that may be used in the synthesis of oxazolidinone libraries and compounds as shown in Figure 4.

Figure 48 shows building blocks  $R_2R_3NH$  and  $R_1COOH$  that may be used to make compounds of formula 1k and libraries thereof.

Figure 49 is a general scheme showing routes of synthesis of 3-(heteroaryl)oxazolidinones.

Figure 50 is another general scheme showing routes of synthesis of 3-(heteroaryl)oxazolidinones.

## DETAILED DESCRIPTION

### Definitions

As used herein, the terms and phrases have the meanings and definitions known in the art. Some of the more commonly used phrases are described in more detail below.

“Combinatorial library” or “array” is an intentionally created collection of differing molecules which can be prepared synthetically and screened for biological activity in a variety of different formats (e.g., libraries of soluble molecules, libraries of molecules bound to a solid support). Typically, combinatorial libraries contain between about 6 and two million compounds. In one embodiment, combinatorial libraries contain between about 48 and 1 million compounds. For example, combinatorial libraries may contain between about 96

and 250,000 compounds. In another embodiment, combinatorial libraries may contain about 40 to 100 compounds.

“Alkyl” refers to a cyclic, branched or straight chain chemical group containing only carbon and hydrogen, such as methyl, pentyl, and adamantyl.

Alkyl groups can either be unsubstituted or substituted with one or more substituents, *e.g.*, halogen, alkoxy, acyloxy, amino, hydroxyl, mercapto, carboxy, benzyloxy, phenyl, and benzyl. Alkyl groups can be saturated or unsaturated (*e.g.*, containing  $-C=C-$  or  $-C\equiv C-$  subunits), at one or several positions. Typically, alkyl groups will comprise about 1 to 12 carbon atoms, for example about 1 to 10, or about 1 to 8 carbon atoms.

“Heteroalkyl” refers to a cyclic, branched or straight chain chemical group containing carbon, hydrogen and at least one heteroatom. The heteroatom will be typically nitrogen, oxygen or sulfur. Heteroalkyl groups can either be unsubstituted or substituted with one or more substituents, *e.g.*, halogen, alkoxy, acyloxy, amino, hydroxyl, mercapto, carboxy, benzyloxy, phenyl, benzyl. Where the heteroalkyl group contains a nitrogen atom, the nitrogen atom can be primary, secondary, tertiary, quaternary or can be in various forms such as an amide or sulfonamide. Heteroalkyl groups can contain one or more unsaturated (*e.g.*,  $-C=C-$  or  $-C\equiv C-$ ) subunits. Typically, heteroalkyl groups will comprise 1 to 12 atoms, for example 1 to 8, or 1 to 4 carbon atoms.

“Aryl” refers to a monovalent unsaturated aromatic carbocyclic group having a single ring (*e.g.* phenyl), multiple rings (*e.g.* biphenyl), or multiple condensed rings (*e.g.* naphthyl or anthryl). Aryl groups can be optionally unsubstituted or substituted with amino, hydroxyl, alkyl, heteroalkyl, alkoxy, halo, mercapto and other substituents. Typically, the aryl group is a substituted single ring compound. For example, the aryl group is a substituted phenyl ring.

“Heteroaryl” refers to a monovalent unsaturated aromatic carbocyclic group having a single ring (*e.g.*, pyridyl or furyl) or multiple condensed rings (*e.g.*, indolizinyll or benzothienyl) and having at least one heteroatom within the ring. The heteroatom in the ring is preferably nitrogen, oxygen or sulfur. Heteroaryl groups can be optionally unsubstituted or substituted with amino,

hydroxyl, alkyl, heteroalkyl, alkoxy, halo, mercapto and other substituents. In one embodiment, the heteroaryl group is substituted.

“Electron withdrawing group” refers to a substituent that draws electrons to itself more than a hydrogen atom would if it occupied the same position in a molecule. This definition according to field effect is discussed in March, “Advanced Organic Chemistry,” 3d Edition, pp. 16-17, Wiley-Interscience, New York. It should be contrasted with a definition based on resonance effects.

Examples of electron withdrawing groups include  $-NR_2$ ,  $-COOH$ ,  $-OR$ ,  $-SR$ ,  $-F$ ,  $-COR$ ,  $-Cl$ ,  $-SH$ ,  $-NO_2$ ,  $-Br$ ,  $-NH_2$ ,  $-SO_2R$ ,  $-I$ ,  $-OH$ ,  $-CN$ ,  $-C=CR_2$ , where R is alkyl, heteroalkyl, aryl or heteroaryl.

“Chemical module” refers to a general class of molecules that can be incorporated into a combinatorial library at a discrete step in the library synthesis. For example, thiols are chemical modules that can be coupled to a substrate, where the synthetic route employs a nucleophile to displace a solid support bound leaving group; isocyanates are chemical modules that can be coupled to a substrate, where the synthetic route employs an electrophile to react with a solid support bound amine. Chemical modules can contain tens, hundreds or thousands of different individual members.

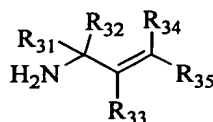
“Protecting group” refers to a chemical group that exhibits the following characteristics: (1) reacts selectively with the desired functionality in good yield to give a protected substrate that is stable to the projected reactions for which protection is desired; 2) is selectively removable from the protected substrate to yield the desired functionality; and 3) is removable in good yield by reagents compatible with the other functional group(s) generated in such protection reactions. Examples of protecting groups can be found in Greene *et al.* (1991) *Protective Groups in Organic Synthesis*, 2nd Ed. (John Wiley & Sons, Inc., New York).

“Biologically active oxazolidinone compounds” or “bioactive oxazolidinone compounds” refers to an oxazolidinone compound, for example, of structure **1b** that exhibits biological activity. For instance, a biologically active oxazolidinone can inhibit the interaction between an enzyme or receptor and its respective substrate(s) or endogenous ligand(s), or inhibit cell growth of a



microorganism, by about at least 15% at a solution concentration of  $10^{-3}$  molar or lower (i.e., it has inhibitory activity). For example, the biologically active oxazolidinone will inhibit such processes at solution concentrations of about  $10^{-4}$  M or lower, or  $10^{-5}$  M or lower, or, e.g., of about  $10^{-6}$  M or lower.

5           “Allylic amine” refers to a compound of the following structure:



10           where  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$  and  $R_{35}$  are independently selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl. Where  $R_{31}$ ,  $R_{32}$ ,  $R_{33}$ ,  $R_{34}$  and  $R_{35}$  are all hydrogen, the allylic amine is allylamine.

15           “Phosgene equivalent” refers to a chemical reagent that can add a C=O group to a molecule in either one or more than one chemical steps. A nonlimiting example of a phosgene equivalent that can add a C=O group in one chemical step is carbonyldiimidazole (CDI). A nonlimiting example of a phosgene equivalent that can add a C=O group in more than one chemical step is ethyl chloroformate.

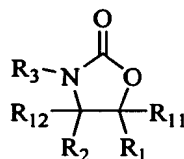
          “Acyl” refers to a group  $-(C=O)-R$ , where R is a substituent such as H, aryl, heteroaryl, alkyl or heteroalkyl. Exemplary acyl groups include formyl, acetyl, propionyl and butyryl.

20           “Sulfonyl” refers to a group  $-(SO_2)-R$ , where R is a substituent such as alkyl, heteroalkyl, aryl, or heteroaryl. Exemplary sulfonyl groups include methylsulfonyl and trifluoromethylsulfonyl.

#### Oxazolidinones

25           Provided are oxazolidinones and combinatorial libraries thereof, as well as methods for their synthesis, for example by solid phase synthesis methods.

          In one embodiment, oxazolidinones have the following structure:

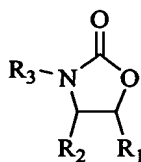
**1a**

where  $R_1$  is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl;  $R_2$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl;  $R_3$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl;  $R_{11}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl; and  $R_{12}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl.

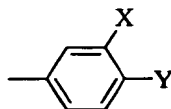
In another embodiment,  $R_3$  of the oxazolidinones **1a** is selected from the group consisting of aryl and heteroaryl, where the aryl and heteroaryl groups are the aryl and heteroaryl groups attached to the amines of Table 2 and Figures 29, 30 and 31.

In another embodiment,  $R_3$  of the oxazolidinones **1a** is a heteroaryl group such as a pyridyl group, a thienylphenyl group, an oxazolyl group or a pyrrolyl group, or is a (morpholino)fluorophenyl group.

In another embodiment, the oxazolidinones have the structure

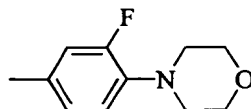
**1d**

where  $R_1$  is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl,  $R_2$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl, and  $R_3$  has the structure



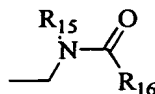
where 'X' is selected from the group consisting of hydrogen, electron withdrawing groups, alkyl, heteroalkyl, aryl and heteroaryl, and 'Y' is selected from the group consisting of hydrogen, electron withdrawing groups, alkyl, heteroalkyl, aryl and heteroaryl.

5 In another embodiment,  $R_3$  of the oxazolidinones **1d** is the following



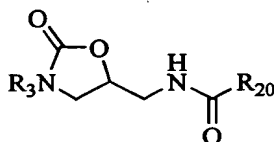
structure:

In another embodiment,  $R_1$  of the oxazolidinones **1d** is the following structure:



where  $R_{15}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl, and where  $R_{16}$  is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl.

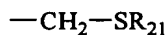
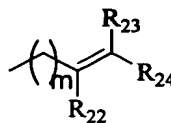
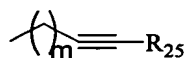
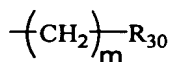
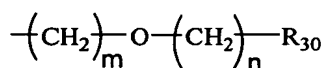
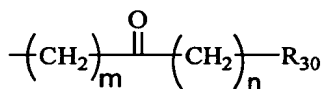
15 In one embodiment, oxazolidinones are provided that are antimicrobial compounds. In one embodiment, the antimicrobial compounds have the structure:



**1e**

where  $R_3$  is selected from the group consisting of aryl and heteroaryl, and where  $R_{20}$  is selected from the group consisting of structures A, B, C, I, J and K:

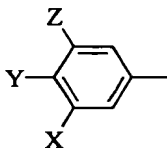
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**A****B****C****I****J****K**

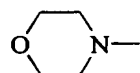
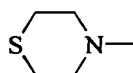
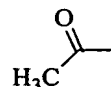
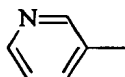
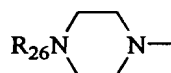
where m is 0, 1, 2 or 3, and where n is 0, 1, 2 or 3, and where R<sub>21</sub> is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl, and where R<sub>22</sub>, R<sub>23</sub> and R<sub>24</sub> are independently selected from the group consisting of hydrogen, alkyl, heteroalkyl and heteroaryl, and where R<sub>25</sub> is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl, and where R<sub>30</sub> is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl.

In another embodiment, R<sub>3</sub> of the antimicrobial compound **1e** is selected from the group consisting of aryl and heteroaryl, where the aryl and heteroaryl groups are the aryl and heteroaryl groups attached to the amines of Table 2 and Figures 29, 30 and 31.

In another embodiment, R<sub>3</sub> of the antimicrobial compound **1e** has the following structure:

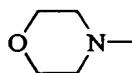


where X and Z are independently selected from the group consisting of hydrogen and fluoride, and where Y is selected from the group consisting of structures D, E, F, G and H:

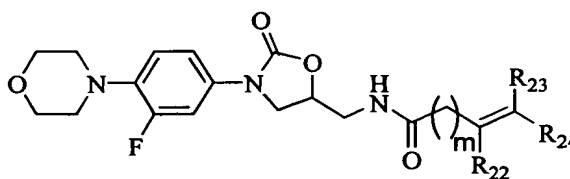
**D****E****F****G****H**

where  $R_{26}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl.

In another embodiment, Y of the antimicrobial compound **1e** has the structure D:

**D**

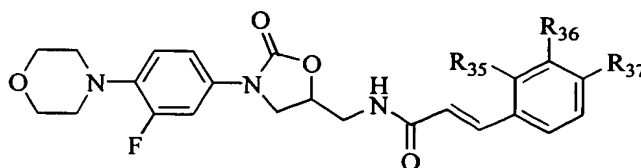
In another embodiment, the antimicrobial compound has the structure:

**1f**

where  $m$  is 0, 1, 2 or 3, and where  $R_{22}$ ,  $R_{23}$  and  $R_{24}$  are independently selected from the group consisting of hydrogen, alkyl, heteroalkyl and heteroaryl.

In another embodiment,  $m$  in the antimicrobial compound **1f** is 0,  $R_{22}$  and  $R_{23}$  are hydrogen, and  $R_{24}$  is an aryl group.

In another embodiment, the antimicrobial compound is of the structure

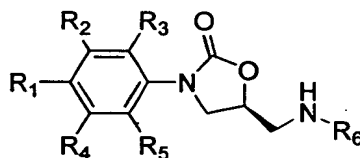


5

where  $R_{35}$ ,  $R_{36}$  and  $R_{37}$  are independently selected from the group consisting of hydrogen, an electron withdrawing group, alkyl, heteroalkyl, aryl and heteroaryl.

In another embodiment, oxazolidinones and combinatorial libraries thereof, of the structure **1b** shown in Figure 1 are provided:

10

**1b**

In one embodiment, substituent  $R_1$  of compound **1b** is one of the following functional groups:  $C(O)NR_7R_8$ , wherein  $R_7$  and  $R_8$  are, independently, hydrogen, alkyl, heteroalkyl, aryl or heteroaryl (See Figures 33, 34, 35, 36 and 37 for nonlimiting examples of amines used to construct such libraries);  $C(O)OR_9$ , wherein  $R_9$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $C(O)R_{10}$ , wherein  $R_{10}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $SR_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)_2R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $NR_{12}R_{13}$ , wherein  $R_{12}$  and  $R_{13}$  are, independently, hydrogen, acyl, sulfonyl, alkyl, heteroalkyl, aryl or heteroaryl;  $NR_x(C=O)R_y$ , wherein  $R_x$  and  $R_y$  are independently hydrogen, alkyl, heteroalkyl, aryl, or heteroaryl;  $NR_x(SO_2)R_y$ , wherein  $R_x$  and  $R_y$  are independently hydrogen, alkyl, heteroalkyl, aryl, or heteroaryl, provided  $R_y$  is not H; 2-oxazolyl, wherein

25

$R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position, and wherein  $R_{14}$  and  $R_{15}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position, and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; and,  $CH_2NR_{18}R_{19}$ , wherein  $R_{18}$  and  $R_{19}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, acyl or sulfonyl. The substituents  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group; and,  $R_6$  is acyl or sulfonyl.

In one embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is alkyl, heteroalkyl aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is aryl or heteroaryl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ , and wherein  $n$  is an integer ranging from 0 to about 5. In one embodiment, the substituents are as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is heteroaryl;  $R_2$  is fluorine (F);  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $C(O)OR_9$ , wherein  $R_9$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl. In one embodiment the substituents are as follows:  $R_1$  is  $C(O)OR_9$ , wherein  $R_9$  is alkyl or heteroalkyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ , and wherein  $n$  is an integer ranging from 0 to about 5. For example, the substituents are as follows:  $R_1$  is  $C(O)OR_9$ , wherein  $R_9$  is alkyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $C(O)R_{10}$ , wherein  $R_{10}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $C(O)R_{10}$ ,

wherein  $R_{10}$  is alkyl or aryl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ , and wherein  $n$  is an integer ranging from 0 to about 5. For example, the substituents are as follows:  $R_1$  is  $C(O)R_{10}$ , wherein  $R_{10}$  is alkyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $SR_{11}$ , wherein  $R_{11}$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $SR_{11}$ , wherein  $R_{11}$  is alkyl or heteroalkyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ . For example, the substituents are as follows:  $R_1$  is  $SR_{11}$ , wherein  $R_{11}$  is alkyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $S(O)_2R_{11}$ , wherein  $R_{11}$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $S(O)_2R_{11}$ , wherein  $R_{11}$  is alkyl or heteroalkyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ . For example, the substituents are as follows:  $R_1$  is  $S(O)_2R_{11}$ , wherein  $R_{11}$  is alkyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $S(O)R_{11}$ , wherein  $R_{11}$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $S(O)R_{11}$ , wherein  $R_{11}$  is alkyl or heteroalkyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ . For example, the substituents are as follows:  $R_1$  is  $S(O)R_{11}$ , wherein  $R_{11}$  is alkyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as



follows:  $R_1$  is  $NR_{12}R_{13}$ , wherein  $R_{12}$  is hydrogen and  $R_{13}$  is hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, acyl or sulfonyl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen;  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $NR_{12}R_{13}$ , wherein  $R_{12}$  is hydrogen and  $R_{13}$  is acyl or sulfonyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ , and wherein  $n$  is an integer ranging from 0 to about 5. For example, the substituents are as follows:  $R_1$  is  $NR_{12}R_{13}$ , wherein  $R_{12}$  is hydrogen and  $R_{13}$  is acyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position, and wherein  $R_{14}$  and  $R_{15}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position, and wherein  $R_{14}$  and  $R_{15}$  are, independently, an electron withdrawing group;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ . For example, the substituents are as follows:  $R_1$  is 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position, and wherein  $R_{14}$  and  $R_{15}$  are, independently, an electron withdrawing group;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position, and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position, and wherein  $R_{16}$  and  $R_{17}$  are, independently, an electron withdrawing group;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ , and wherein  $n$  is an integer ranging from 0 to about 5. For

example, the substituents are as follows:  $R_1$  is 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position, and wherein  $R_{16}$  and  $R_{17}$  are, independently, an electron withdrawing group;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the substituents of compound **1b** are defined as follows:  $R_1$  is  $CH_2NR_{18}R_{19}$ , wherein  $R_{18}$  is hydrogen and  $R_{19}$  is alkyl, heteroalkyl, aryl, heteroaryl, acyl or sulfonyl;  $R_2$  is an electron withdrawing group;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In one embodiment, the substituents are as follows:  $R_1$  is  $CH_2NR_{18}R_{19}$ , where  $R_{18}$  is hydrogen and  $R_{19}$  is acyl or sulfonyl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)(CH_2)_nCH_3$ . For example, the substituents are as follows:  $R_1$  is  $CH_2NR_{18}R_{19}$ , wherein  $R_{18}$  is hydrogen and  $R_{19}$  is acyl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

#### Synthesis of Combinatorial Libraries of Oxazolidinones **1b**

Provided are methods for the preparation of combinatorial libraries comprising oxazolidinones, for example, of the structure **1b**. (For a general discussion of combinatorial library synthesis, see U.S. Pat. No. 5,549,974, which is hereby incorporated by reference for all purposes.) In one embodiment, the methods comprise attaching an aryl oxazolidinone to a solid support; functionalizing the 4-position of the aryl group; and removing the oxazolidinone from the solid support.

Figure 2 shows a method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is  $C(O)NR_7R_8$ . A plurality of azides **2** are converted to the corresponding iminophosphoranes upon reaction with a phosphine. The ylides are mixed with a plurality of solid supports containing a carbonyl functional group, producing a plurality of imines. The imines are reduced (*e.g.*,  $NaBH_3CN$ ) to provide a plurality of amines **3**. The ester group of **3** is deprotected to afford a plurality of acids **4**. Acylation of the amine and activation of the acid of **4** yields a plurality of activated esters **5**. The activated esters are reacted with an  $R_7R_8NH$  amine unit, providing a plurality of amides **5**. The solid support bound amides **5** are removed from the solid support

using a suitable reagent (*e.g.*, TFA) to afford a plurality of amides **7** in solution.

The plurality of azides **2** is produced starting from a set of substituted methylnitrobenzenes (**8**, Figure 3). The methyl group of **8** is oxidized to provide the corresponding carboxylic acids **9**. The acids are esterified, affording a set of nitro esters **10**. The nitro group of **10** is reduced to yield a set of amines **11**. Acylation of **11** provides a set of protected amines **12**. Amines **12** are reacted with a substituted epoxide to afford a set of amino alcohols, which are cyclized to a set of oxazolidinones **13**. Displacement of the primary alcohol of **13** yields the azides **2**.

Figure 4 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein the substituents are defined as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ . A plurality of azides **14** were converted to the corresponding iminophosphoranes upon reaction with triphenylphosphine. The iminophosphoranes were mixed with a plurality of 5-formyldimethoxyphenoxybutyric acid resin beads (BAL resin beads, Novabiochem), producing a plurality of imines. The imines were reduced with  $NaBH_3CN$  to provide a plurality of amines **15**. The ester group of **15** was deprotected using trimethylsilylchloride (TMSCl) to afford a plurality of acids (**16**). Acylation of the amine with  $Ac_2O$  and activation of the acid with  $PfpOCOCF_3$  yielded a plurality of activated esters **17**. The activated esters were reacted with an  $R_7R_8NH$  unit, providing a plurality of amides **18**. The solid support bound amides **18** were removed from the solid support using TFA to afford a plurality of amides **19** in solution. Figure 47 illustrates amine building blocks  $R_7R_8NH$  that may be used in the synthesis of oxazolidinone libraries and compounds as shown in Figure 4.

Figure 5 shows exemplary methods for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is either  $C(O)OR_9$  or  $C(O)R_{10}$ . A plurality of solid support bound acids **4** are converted into activated acids **20**. To prepare an oxazolidinone library, wherein  $R_1$  is  $C(O)OR_9$ , the activated acids **20** are reacted with an  $R_9OH$  unit, providing a

plurality of esters **21**. The esters are removed from the solid support upon treatment with a suitable reagent, affording a plurality of amides **22** in solution. To prepare an oxazolidinone library, wherein  $R_1$  is  $C(O)R_{10}$ , the activated acids **20** are reacted with an amine, providing a plurality of Weinreb amides **23**. The

5 Weinreb amides are reacted with an organometallic unit (e.g.,  $LiAlH_4$  or  $MeMgBr$ ), affording a plurality of ketones **24**. The ketones **24** are removed from the solid support upon treatment with a suitable reagent, producing a plurality of ketones **25** in solution.

Figure 6 shows an exemplary method for the preparation of combinatorial

10 libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is  $SR_{11}$ . A plurality of azides **26** are converted to the corresponding iminophosphoranes upon reaction with a phosphine. The iminophosphoranes are mixed with a plurality of solid supports containing a carbonyl functional group, producing a plurality of imines. The imines are reduced to provide a plurality of amines **27**. Acylation of

15 the amine and deprotection of the sulfide of **27** yields a plurality of thiols **28**. Alkylation of **28** with an electrophile provides a plurality of sulfides **29**. The solid support bound sulfides **29** are removed from the solid support using a suitable reagent to afford a plurality of sulfides **30** in solution. Another embodiment is shown in Figure 41. Figures 44 and 45 illustrate building blocks  $R_2X$ , where X is

20 halo, which may be used in the synthesis of sulfide oxazolidinone libraries and compounds as shown in Figure 41 and also can be used as  $R_{11}X$  in the synthesis shown in Figure 6.

Figure 7 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is  $S(O)R_{11}$  or

25  $S(O)_2R_{11}$ . To prepare an oxazolidinone library, wherein  $R_1$  is  $S(O)R_{11}$ , a plurality of solid support bound sulfides **29** is converted into a plurality of sulfoxides **31** upon oxidation. The sulfoxides are removed from the solid support upon treatment with a suitable reagent, affording a plurality of sulfoxides **32** in solution. To prepare an oxazolidinone library, wherein  $R_1$  is  $S(O)_2R_{11}$ , a plurality of solid

30 support bound sulfides **29** is converted into a plurality of sulfones **33** upon oxidation. The sulfones are removed from the solid support upon treatment with a suitable reagent, affording a plurality of sulfones **34** in solution.

The plurality of azides **26** is produced starting from a set of substituted anilines **35**. The aniline is subjected to electrophilic aromatic substitution at the 4-position, providing a set of isothiocyanates **36**. The amine portion of **36** is protected to produce **37**. The isothiocyanate group of **37** is reacted with sodium sulfide and trityl bromide to afford a set of protected sulfides **38**. The protected aniline of **38** is reacted with a substituted epoxide and cyclized, yielding a set of oxazolidinones **39**. Conversion of the primary alcohol of **39** to an azide produces the set of azides **26**. See Figure 8.

Figure 9 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is  $NR_{12}R_{13}$ . A plurality of solid support bound azides **5**, which contain an activated ester, are converted into a plurality of acyl azides **40**. The acyl azides are rearranged, providing a plurality of protected anilines **41**. Deprotection of **41** affords a plurality of anilines **42**, which are reacted with electrophilic units  $R_{12}X$  and  $R_{13}X$  to yield a plurality of substituted anilines **43**. The solid support bound substituted anilines **43** are removed from the solid support using a suitable reagent to afford a plurality of substituted anilines **44** in solution. Another embodiment is shown in Figure 39, which is a scheme showing the synthesis of acylamino oxazolidinone compounds and libraries, wherein  $R_1$  and  $R_2$  are substituents, for example, H, alkyl, heteroalkyl, aryl, heteroaryl, or alkoxy. Figures 42 and 43 illustrate building blocks  $R_2COOH$  that may be used for synthesis of acylamino oxazolidinone libraries and compounds as shown in Figure 39, and also may be used in other syntheses such as those shown in Figure 9.

Figure 10 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is 2-oxazolyl with a cyano group at the 4-position and an amino group at the 5-position. A plurality of azides **2** are converted to the corresponding iminophosphoranes upon reaction with a phosphine. The ylides are mixed with a plurality of solid supports containing a carbonyl functional group, producing a plurality of amines **3**. The ester group of **3** is deprotected to provide plurality of carboxylic acids. The amine is acylated and the carboxylic acid activated, yielding a plurality of esters **5**. Reaction of **5** with amino malonitrile affords a plurality of oxazoles **45**. The solid

support bound oxazoles are removed from the solid support using a suitable reagent to produce a plurality of oxazoles **46** in solution.

Figure 11 shows exemplary methods for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is either 2-oxazolyl containing  $R_{14}$  at the 4-position and  $R_{15}$  at the 5-position, or 2-oxazolyl containing cyano at the 4-position and  $R_{15}$  at the 5-position. To prepare an oxazolidinone library, wherein  $R_1$  is 2-oxazolyl containing  $R_{14}$  at the 4-position and  $R_{15}$  at the 5-position, a plurality of solid support bound oxazoles **45** is reacted with a reagent capable of converting the 4-cyano group to a different functionality (e.g. hydrolysis to acid) to provide a plurality of oxazole compounds **47**. The 5-amino substituent of **47** is alkylated or acylated to produce a plurality of compounds **48**. The solid support bound oxazoles **48** are removed from the solid support using a suitable reagent to afford a plurality of  $R_{14}$ ,  $R_{15}$ -substituted oxazoles **49** in solution. To prepare an oxazolidinone library, wherein  $R_1$  is 2-oxazolyl containing cyano at the 4-position and  $R_{15}$  at the 5-position, the 5-amino substituent of **45** is alkylated or acylated to produce a plurality of compounds **50**. The solid support bound oxazoles **50** are removed from the solid support using a suitable reagent to afford a plurality of cyano,  $R_{15}$  substituted oxazoles **51** in solution.

Figure 12 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is 2-aminothiazolyl containing  $R_{16}$  at the 4-position and  $R_{17}$  at the 5-position. A plurality of anilines **42** is reacted with a protected isothiocyanate to provide a plurality of protected thiocarbamates **52**. The thiocarbamates are deprotected, producing a plurality of thiocarbamates **53**. Reaction of **53** with an  $\alpha$ -halo ketone yields a plurality of aminothiazoles **54**. The solid support bound amino thiazoles are removed from the solid support using a suitable reagent to afford a plurality of aminothiazoles **55** in solution.

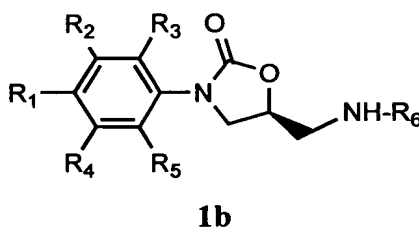
Figure 13 shows an exemplary method for the preparation of combinatorial libraries comprising oxazolidinones of the structure **1b**, wherein  $R_1$  is  $CH_2NR_{18}R_{19}$ . A plurality of azides **56** is converted to the corresponding iminophosphoranes upon reaction with a phosphine. The iminophosphoranes are

mixed with a plurality of solid supports, producing a plurality of imines. The imines are reduced and acylated to provide a plurality of acetals **57**. The acetals are removed, yielding a plurality of aldehydes **58**. Reductive amination of the aldehydes affords a plurality of amines **59**. The solid support bound amines are removed from the solid support using a suitable reagent to afford a plurality of amines **60** in solution.

The plurality of azides **67** is produced starting from a set of substituted methylnitrobenzenes **61** (Figure 14). The methyl group of **61** is oxidized to provide the acetals **62**. Transacetalization of **62** yields a set of dimethyl acetals **63**. The nitro group of **63** is reduced, affording a set of anilines **64**, which are protected **65**. The protected anilines are reacted with a substituted epoxide, and the resulting amino alcohols are cyclized to yield a set of oxazolidinones **66**. The primary of alcohol of **66** is displaced with azide, producing **67**.

#### Embodiments of Biologically Active Oxazolidinone Compounds

In one embodiment, biologically active oxazolidinones, for example with antibiotic activity, are provided, for example, of the structure **1b**:



In one embodiment, the substituents on **1b** are as follows:

Substituent  $R_1$  of compound **1b** is one of the following functional groups:  $C(O)NR_7R_8$ , wherein  $R_7$  and  $R_8$  are, independently, hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $C(O)OR_9$ , wherein  $R_9$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $C(O)R_{10}$ , wherein  $R_{10}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $SR_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)_2R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $S(O)R_{11}$ , wherein  $R_{11}$  is hydrogen, alkyl, heteroalkyl, aryl or heteroaryl;  $NR_{12}R_{13}$ , wherein  $R_{12}$  and  $R_{13}$  are, independently, hydrogen, acyl, sulfonyl, alkyl, heteroalkyl, aryl or

heteroaryl; 2-oxazolyl, wherein  $R_{14}$  is at the 4-position and  $R_{15}$  is at the 5-position, and wherein  $R_{14}$  and  $R_{15}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; 2-aminothiazolyl, wherein  $R_{16}$  is at the 4-position and  $R_{17}$  is at the 5-position, and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl or an electron withdrawing group; and  $CH_2NR_{18}R_{19}$ , wherein  $R_{18}$  and  $R_{19}$  are, independently, hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, acyl or sulfonyl. The substituents  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group; and,  $R_6$  is acyl or sulfonyl.

In one embodiment, the biologically active oxazolidinones of structure **1b** are substituted as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is alkyl, heteroalkyl, aryl or heteroaryl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ . In one embodiment, the oxazolidinone is substituted as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is aryl or heteroaryl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ . In another embodiment, the oxazolidinone is substituted as follows:  $R_1$  is  $C(O)NR_7R_8$ , wherein  $R_7$  is hydrogen and  $R_8$  is heteroaryl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

In another embodiment, the biologically active oxazolidinones of structure **1b** are substituted as follows:  $R_1$  is 2-oxazolyl, containing a cyano group at the 4-position and an amino group at the 5-position of the oxazole;  $R_2$  and  $R_4$  are, independently, hydrogen or an electron withdrawing group;  $R_3$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl or sulfonyl. The oxazolidinone is, for example, substituted as follows:  $R_1$  is 2-oxazolyl, containing a cyano group at the 4-position and an amino group at the 5-position of the oxazole;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. In another embodiment, the oxazolidinone is substituted as follows:  $R_1$  is 2-oxazolyl, containing a cyano group at the 4-position and an amino group at the 5-position of the oxazole;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .



In another embodiment, the biologically active oxazolidinones of structure **1b** are substituted as follows:  $R_1$  is 2-aminothiazolyl, wherein the 4-position of the thiazole contains  $R_{16}$  and the 5-position contains  $R_{17}$ , and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen, alkyl, aryl or heteroaryl;  $R_2$  and  $R_4$  are, independently, hydrogen or an electron withdrawing group;  $R_3$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl. For example, the oxazolidinone is substituted as follows:  $R_1$  is 2-aminothiazolyl, wherein the 4-position of the thiazole contains  $R_{16}$  and the 5-position contains  $R_{17}$ , and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen, alkyl or aryl;  $R_2$  is a halogen;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ . In another embodiment, the oxazolidinone is substituted as follows:  $R_1$  is 2-aminothiazolyl, wherein the 4-position of the thiazole contains  $R_{16}$  and the 5-position contains  $R_{17}$ , and wherein  $R_{16}$  and  $R_{17}$  are, independently, hydrogen or aryl;  $R_2$  is fluorine;  $R_3$ ,  $R_4$  and  $R_5$  are hydrogen; and,  $R_6$  is acyl, wherein the acyl group is of the structure  $C(O)CH_3$ .

#### Synthesis of Biologically Active Oxazolidinone Compounds **1b**

Exemplary methods for the solid phase synthesis of biologically active oxazolidinones, for example, of the structure **1b** are provided. The methods comprise: providing an iminophosphorane; mixing the iminophosphorane with a resin that comprises carbonyl groups to form an imine intermediate; and reducing the imine intermediate to afford a compound attached to the resin through an amine linkage.

Figure 15 generally shows the solid phase synthesis of oxazolidinone compounds. Oxazolidinone **68**, wherein  $R_{20}$  is (4- $R_1$ )-aryl (**1**), is converted into imine **71** by 1 of 2 pathways: azide **68** is treated with a phosphine ( $R_{21}$  is alkyl or aryl) to provide iminophosphorane **69**, which is reacted with a carbonyl containing resin; or, azide **68** is reduced to amine **70**, which is reacted with a carbonyl containing resin. Imine **71** is reduced using an appropriate reducing agent (e.g.,  $NaBH_3CN$ ), affording compound **72**, which is attached to the resin through an amine linkage.

Figure 16 generally shows the synthesis of compound **68**. Epoxide **73** is subjected to nucleophilic attack by  $R_{20}NH_2$ , producing an amino alcohol. The amino alcohol is cyclized to provide oxazolidinone **74**. Removal of the ester

protecting group of **74** affords a primary alcohol **75**. Displacement of the primary alcohol with azide yields **68**.

The carbonyl containing resin is graphically depicted on Figure 15. Substituent  $R_{23}$  is hydrogen, alkyl, aryl, O-alkyl or O-aryl. The polymeric support (filled circle) is composed of a variety of materials, including, without limitation, Tentagel, (cross-linked)polystyrene, (cross-linked)polyethyleneglycol, polyethyleneglycol-polystyrene compositions, and polyacrylate. Substituent  $R_{22}$  is shown on Figure 17:  $R_{24}$  is hydrogen,  $CH_3O$ ,  $NO_2$ ; and,  $R_{25}$  is  $(CH_2)_nCONH$ , wherein  $n$  is an integer ranging from 1 to about 5.

Figure 18 shows an embodiment of the solid phase synthesis methods. Azide **14** is converted into an iminophosphorane upon treatment with triphenylphosphine. The iminophosphorane is reacted with BAL resin to provide an imine, which is reduced with  $NaBH_3CN$ , affording amine **15**. Compound **15** is reacted with  $TMSCl$  to remove the ester group (**16**). The amine of **16** is acylated and the carboxylic acid is transformed into an activated ester (**17**). Treatment of the activated ester with  $Bu_4NN_3$  or  $TMSN_3$  affords acyl azide **77**. Acyl azide **77** is rearranged, yielding a protected aniline (**78**). The Fmoc protecting group is removed (**79**), and the resulting aniline is sulfonated with  $p-O_2NC_6H_4SO_2Cl$  (**80**). The sulfonated aniline (**80**) is removed from the solid support upon reaction with TFA, providing **81**. Another embodiment is shown in Figure 40. Figure 46 illustrates sulfonyl chloride building blocks  $R_2SO_2Cl$  that may be used in the synthesis of sulfonamide oxazolidinone libraries and compounds as shown in Figure 40, and also may be used in the syntheses shown in Figure 18.

Figure 19 shows another embodiment of the solid phase synthesis methods. Aniline **79** is reacted with  $Fmoc-N=C=S$  to provide protected thiourea **82**. The protected thiourea is treated with piperidine, affording a deprotected thiocarbamate (**83**). Reaction of **83** with 2-bromoacetophenone yields thiazole **84**. Treatment of **84** with TFA cleaves the thiazole from the solid support, providing **85**.

Figure 20 shows another embodiment of the solid phase synthesis methods. Azide **4** is converted into an iminophosphorane upon treatment with triphenyl phosphine. The iminophosphorane is reacted with BAL resin, providing

an imine. The imine is reduced using  $\text{NaBH}_3\text{CN}$  to afford solid support bound amine **15**. The ester of **15** is deprotected using  $\text{TMSCl}$ , yielding a carboxylic acid; the amine is acylated upon reaction with  $\text{Ac}_2\text{O}$ ; and, the acid is activated using  $\text{PfpOCOCF}_3$ , yielding **17**. Reaction of **17** with aminomalonitrile provides oxazole **86**. Treatment of **86** with TFA cleaves the oxazole from the solid support to afford **87**.

Figure 21 shows two embodiments of the solid phase synthesis methods. Compound **17** is treated with  $\text{HN}(\text{OCH}_3)\text{CH}_3$  to provide Weinreb amide **88**. Amide **88** is either reduced with  $\text{LiAlH}_4$  to afford aldehyde **89** or reacted with  $\text{MeMgI}$ , a Grignard reagent, to yield ketone **91**. Treatment of either aldehyde **89** or ketone **91** with TFA provides, respectively, cleaved products **90** and **92**.

Figure 22 shows two embodiments of the solid phase synthesis methods. Compound **79** is treated with either a dialdehyde to provide morpholine **93** or a diacetal to afford pyrrole **95**. Treatment of either morpholine **93** or pyrrole **95** with TFA provides, respectively, cleaved products **94** and **96**.

Figure 48, shows building blocks  $\text{R}_2\text{R}_3\text{NH}$  and  $\text{R}_1\text{COOH}$  that may be used to make exemplary oxazolidinone compounds of formula **1k** and libraries thereof.

#### Synthesis of Oxazolidinone Compounds **1a**

Oxazolidinone compounds **1a** and precursors thereof may be made by a variety of methods as disclosed herein.

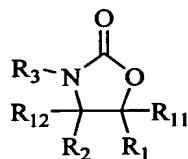
An embodiment of a solid phase synthesis method to make amino alcohols, where  $\text{R}_1$  is an alkyl, is shown in Figure 23. An olefin group is attached to the surface of a solid support (**5a**) providing the functionalized resin **6a**. The olefin can have the following functionality: "m" is 0, 1, or 2; "n" is 0, 1, or 2;  $\text{R}_{10}$ ,  $\text{R}_{11}$ ,  $\text{R}_{12}$ ,  $\text{R}_2$  and  $\text{R}_3$  are independently hydrogen, alkyl, heteroalkyl, aryl or heteroaryl. The olefin is chemically modified yielding epoxide **7a**. Addition of a substituted amine to the distal carbon of immobilized epoxide **7a** affords solid support bound amino alcohol **8a**. Solid support bound amino alcohol **8a** is treated with a phosgene equivalent providing oxazolidinone **15a**, which is cleaved under standard conditions to yield free oxazolidinone **16a**. Acylation of **16a** yields oxazolidinone **16b**.

Another embodiment of the solid phase synthesis method to make oxazolidinones is shown in Figure 24. Immobilized epoxide **12a** was treated with aniline in the presence of lithium triflate to provide solid support bound amino alcohol **19a**. Reaction of **19a** with CDI yielded oxazolidinone **20a**. Alternatively, **20a** was prepared directly from epoxide **12a** upon treatment with a lithium salt of aniline benzylcarbamate. Addition of TFA to oxazolidinone **20a** provided free oxazolidinone **21a**, which was acetylated to yield acetamide **22a**.

Another embodiment of the solid phase synthesis method to make oxazolidinones is shown in Figure 25. PNP Wang Resin (**23a**) was reacted with allyl amine to provide carbamate **24a**. The terminal olefin of carbamate **24a** was oxidized with *m*CPBA to yield immobilized epoxide **12a**. Addition of 3-fluoro-4-morpholino aniline to **12a** produced amino alcohol **25a**, which was cyclized to oxazolidinone **26a** upon treatment with CDI. Reaction of **26a** with TFA provided free amine **27a**. Addition of acetyl chloride to **27a** produced acetamide **28a**.

#### Synthesis of Combinatorial Libraries Comprising Oxazolidinones 1a

In one embodiment, provided are methods for the synthesis of combinatorial libraries comprising oxazolidinones **1a** and compositions formed from this method. In one embodiment, oxazolidinones **1a** are compounds of the following structure:



**1a**

where  $R_1$  is selected from the group consisting of alkyl, heteroalkyl, aryl and heteroaryl;  $R_2$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl;  $R_3$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl;  $R_{11}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl; and  $R_{12}$  is selected from the group consisting of hydrogen, alkyl, heteroalkyl, aryl and heteroaryl.

An embodiment of the solid phase method to make oxazolidinone libraries, where  $R_1$  is an alkyl group, is described in reference to Figure 23. Olefin groups are attached to the surface of a plurality of solid supports **5a** providing functionalized resins **6a**. The olefin groups can have the following functionality:  
5 "m" is 0, 1, or 2; "n" is 0, 1, or 2;  $R_2$ ,  $R_3$ ,  $R_{10}$ ,  $R_{11}$  and  $R_{12}$  are independently hydrogen, alkyl, heteroalkyl, aryl or heteroaryl. The individual olefin groups are chemically modified to yield epoxides **7a**. Addition of different amine units to the distal carbon of the epoxides **7a** affords a plurality of amino alcohols **8a**.

10 A plurality of solid support bound amino alcohols **8a** is treated with a phosgene equivalent to provide a plurality of oxazolidinones **15a**, which are cleaved under standard conditions to yield the free oxazolidinones **16a**.

Another embodiment of the solid phase method to make oxazolidinone libraries is shown in Figures 26 and 27. Carboxylic acid **30a** is attached to amine resin **29a** to provide amide **31a**. Reductive amination of **31a** employing amine  
15 **32a** yields the functionalized amine **33a**, which is added to an array of individual reaction chambers. Addition of sulfonyl chloride units to a plurality of amines **33a** produces the sulfonamides **34a**. The sulfonamides are cleaved from the solid support using standard conditions providing a plurality of free sulfonamides **35a**. Addition of carboxylic acid or carboxylic acid derivative units to a plurality of  
20 amines **33a** produces the amides **36a**. The amides **36a** are cleaved from the solid support using standard conditions providing a plurality of free amides **37a**. Addition of isocyanate units to a plurality of amines **33a** produces the ureas **38a**. The ureas **38a** are cleaved from the solid support using standard conditions providing a plurality of free ureas **39a**.

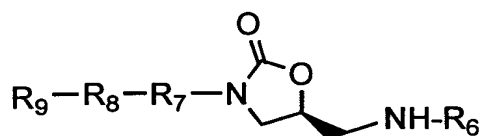
25 Another embodiment of the solid phase method to make oxazolidinone libraries is shown in Figure 28. Coupling of  $\alpha$ -bromo acetic acid to amine **33a** provides amide **40a**, which is divided into an array of individual reaction chambers. Nucleophilic addition of thiol units to a plurality of amides **40a** yields the  $\alpha$ -thio amides **41a**, which are cleaved from the solid support upon treatment  
30 with TFA producing a plurality of free  $\alpha$ -thio amides **42a**. Nucleophilic addition of triphenylphosphine to a plurality of amides **40a** yields solid support bound Wittig reagents that are coupled with aldehyde units affording a plurality of  $\alpha$ ,  $\beta$ -

unsaturated amides **43a**. The amides were cleaved from the solid support upon treatment with TFA to produce a plurality of free  $\alpha$ ,  $\beta$ -unsaturated amides **44a**. Nucleophilic addition of amine units to a plurality of amides **40a** yields the  $\alpha$ -amino amides **45a**, which are cleaved from the solid support upon treatment with TFA producing a plurality of free  $\alpha$ -amino amides **46a**.

### 3-(Polysubstituted)oxazolidinones

A variety of 3-(polysubstituted)oxazolidinones are provided, which optionally have biological activity, such as antimicrobial activity.

In one embodiment, 3-(polysubstituted)oxazolidinones **2c** as well as combinatorial libraries comprising the compounds are provided:



**2c**

In **2c**, in one embodiment:

$R_6$  is acyl or sulfonyl;

$R_7$  is aryl or heteroaryl;

$R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , where  $n = 0-6$ , and R and R' are substituents, for example, independently H, or alkyl, such as  $C_1$ - $C_7$  alkyl, or heteroalkyl, aryl or heteroaryl; and

$R_9$  is hydrogen, OH, alkyl, aryl, heteroalkyl, or heteroaryl.

In another embodiment, 3-[4-(heteroaryl)aminocarbonylaryl]-oxazolidinones and 3-[4-(N-oxide heteroaryl)aminocarbonylaryl]-oxazolidinones are provided.

In one embodiment of **2c**:

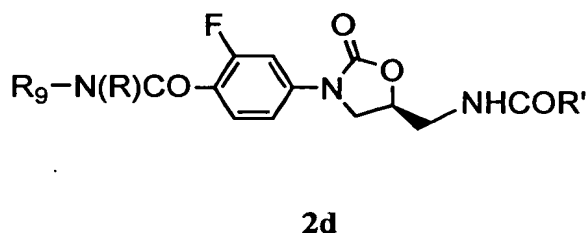
$R_6$  is  $C(=O)R$ , where  $R$  is a substituent, for example, H or alkyl, such as  $C_1$ - $C_7$  alkyl, such as methyl or ethyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

$R_7$  is aryl;

5  $R_8$  is an amide group, such as  $NH(C=O)$  or  $NR'(C=O)$ , where  $R'$  is a substituent, for example, H, heteroalkyl, aryl, heteroaryl, or alkyl, such as  $C_1$ - $C_7$  alkyl, such as methyl; and

10  $R_9$  is hydrogen or a heteroaryl group, such as an unsubstituted or substituted heteroaryl group, wherein the heteroaryl group is for example pyridinyl, thiazolyl, benzothiazolyl, isothiazolyl, quinolinyl, 1,3,4-triazolyl, or 1,3,4-thiadiazolyl.

For example, compounds of formula **2d** are provided:



wherein

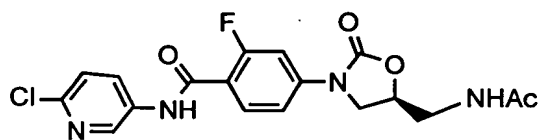
20  $R_9$  is hydrogen or an unsubstituted or substituted heteroaryl group, such as pyridinyl, thiazolyl, benzothiazolyl, isothiazolyl, quinolinyl, 1,3,4-triazolyl, or 1,3,4-thiadiazolyl; and

$R$  and  $R'$  are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, such as methyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

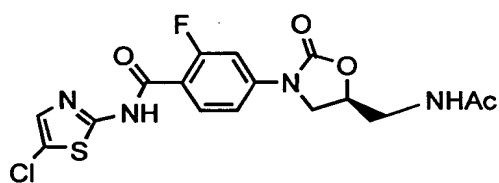
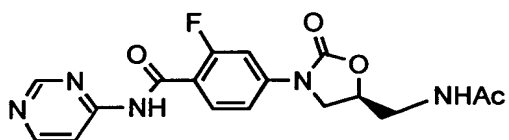
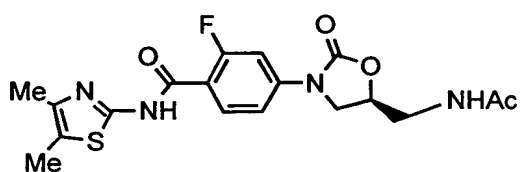
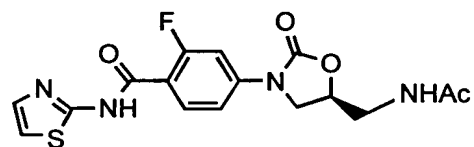
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Exemplary compounds are shown below.

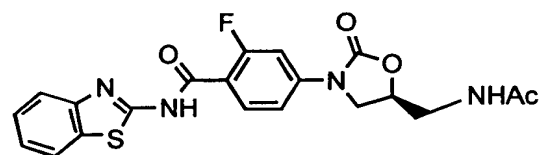
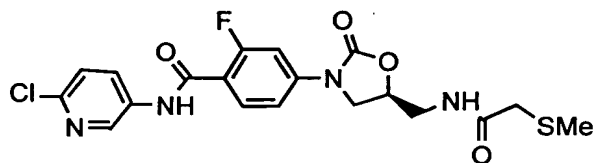
In one embodiment the following nine preferred compounds are provided, which have an MIC against *S. aureus* of about 0.5 to 1  $\mu\text{g/mL}$  using a standard whole cell assay as disclosed herein.



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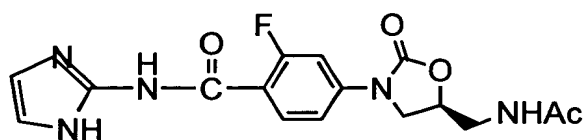
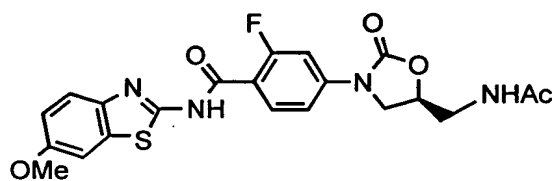


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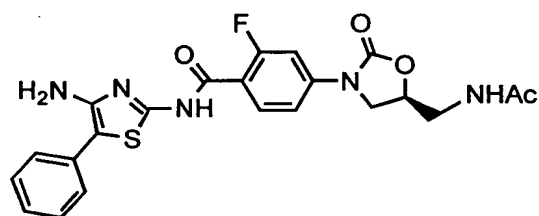
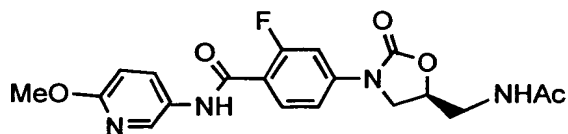
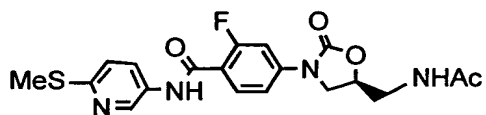




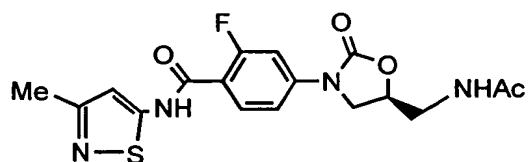
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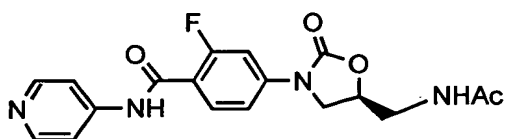
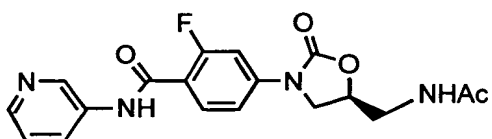
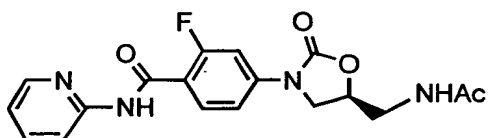
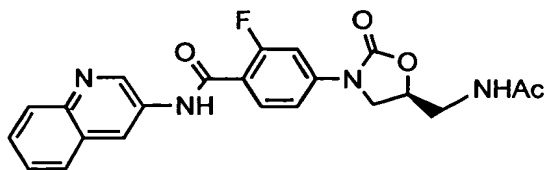
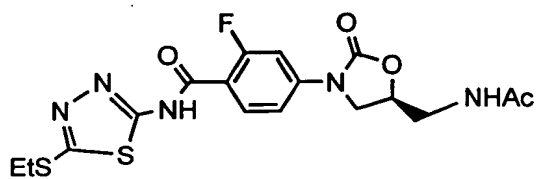
The following nine compounds also are provided that have an MIC against *S. aureus* of about 2 to 4  $\mu\text{g/mL}$  using a standard whole cell assay as disclosed herein.

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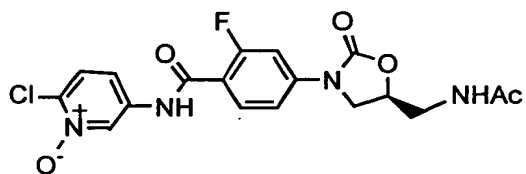
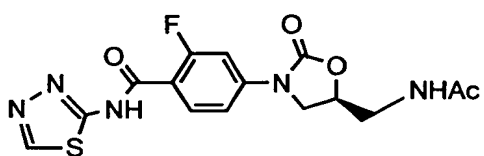
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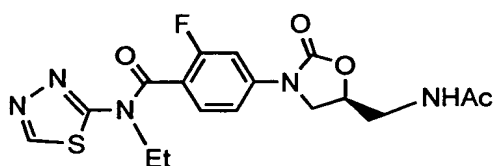
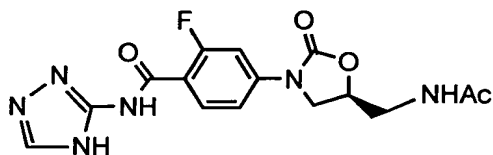
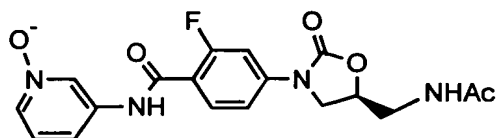


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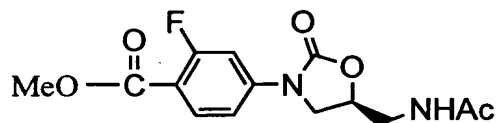
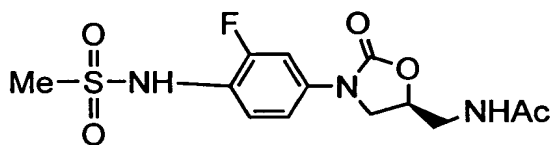
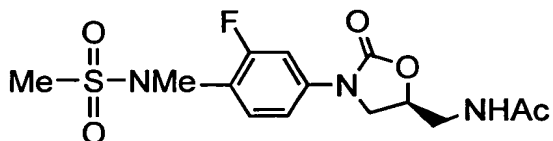
Also provided are the following compounds.

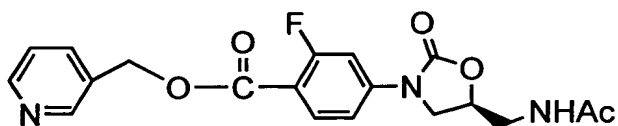
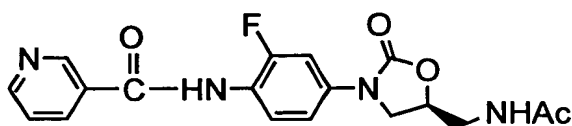


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Other exemplary oxazolidinone compounds within the scope of the invention are shown below:





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Further provided are 3-(aminocarbonyl)oxazolidinones of formula 2c,  
wherein:

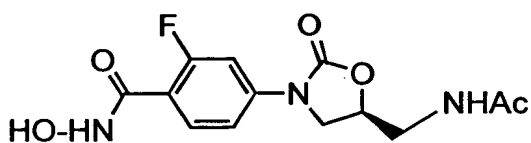
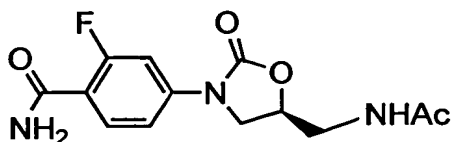
$R_6$  is an acyl group, such as  $C(=O)R$ , where R is a substituent, for example, H or alkyl, such as  $C_1$ - $C_7$  alkyl, including methyl, or *e.g.*, heteroalkyl, aryl or heteroaryl;

$R_7$  is aryl;

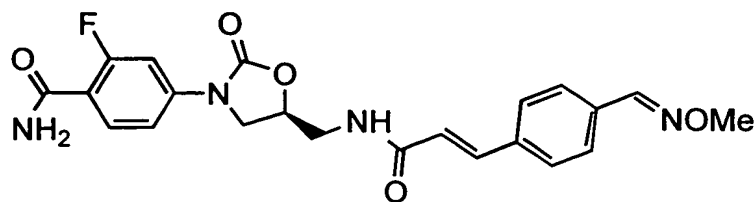
$R_8$  is  $NH(C=O)$ ; and

$R_9$  is hydrogen or OH;

Exemplary compounds are shown below:



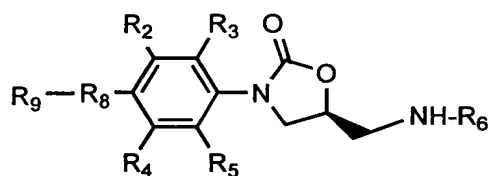
In one embodiment the following compound is provided, which has an MIC against *S. aureus* of about 0.5  $\mu\text{g/mL}$  using a standard whole cell assay as disclosed herein.



### 3-[(Substituted)aryl] oxazolidinones

A variety of 3-[(substituted)aryl] oxazolidinones are provided, which optionally are biologically active, for example as antimicrobial compounds.

In one embodiment oxazolidinones of formula **3c**, and combinatorial libraries comprising compounds of formula **3c** are provided:



**3c**

In one embodiment in **3c**:

$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

$R_6$  is acyl or sulfonyl;

$R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , where  $n = 0-6$ , and where R and R' are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl; and

$R_9$  is alkyl, aryl, heteroalkyl, or heteroaryl.

In a further embodiment, 3-[4-(alkylthio)aryl] oxazolidinones are provided. For example, compounds of formula 3c are provided, wherein:

$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

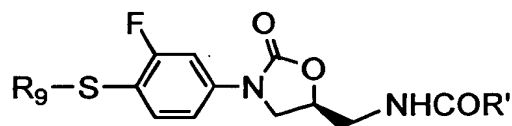
5  $R_6$  is acyl, such as  $C(=O)CH_3$ ;

$R_7$  is an aryl group;

$R_8$  is thio group, such as S; and

$R_9$  is a heteroalkyl group.

10 In another embodiment, compounds of formula 3d are provided:



3d

15

wherein

$R_9$  is alkyl, aryl, heteroalkyl, or heteroaryl; and

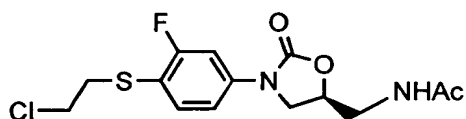
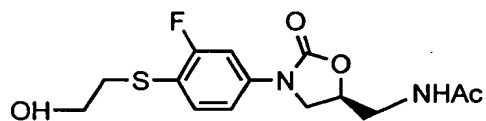
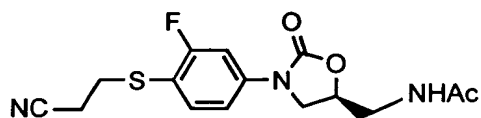
$R'$  is a substituent, for example, H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

20

Exemplary compounds are shown below.

In one preferred embodiment, the following three compounds are provided that have an MIC against *S. aureus* of about 2  $\mu$ g/mL using a standard whole cell assay as disclosed herein.

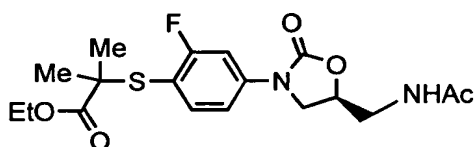
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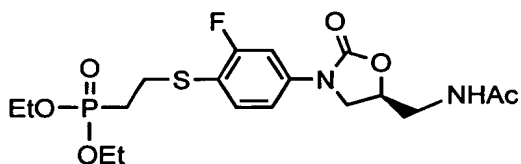
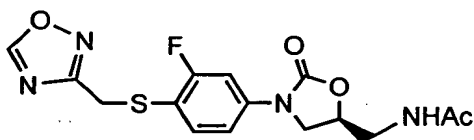
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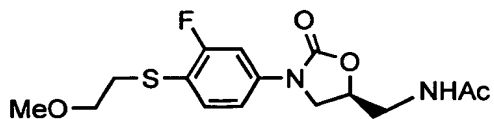
In another embodiment, the following four compounds are provided that have an MIC against *S. aureus* of about 8  $\mu\text{g/mL}$  using a standard whole cell assay as disclosed herein.



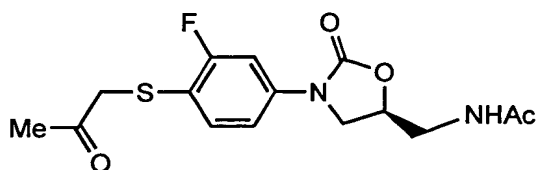
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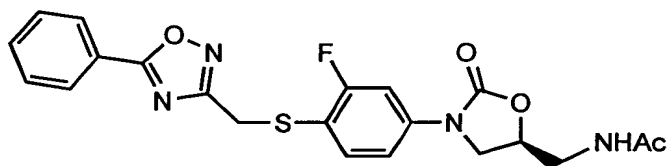
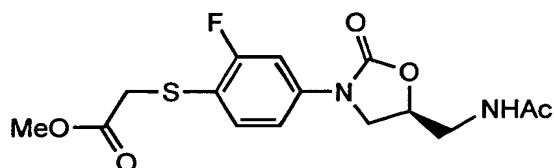
20



Also provided are the following compounds:



5



10

In another embodiment, 3-[4-(ester group)aryl] oxazolidinones useful as antimicrobial agents are provided. For example, compounds of formula 3c are provided wherein:

$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

15

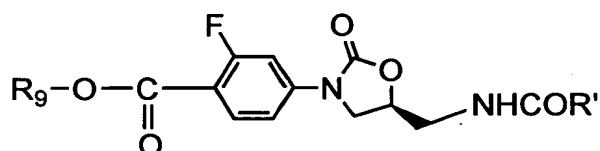
$R_6$  is an acyl group, such as  $C(=O)CH_3$ ;

$R_8$  is an ester, such as  $OC(=O)$ ; and

$R_9$  is an alkyl group, such as a  $C_1$ - $C_7$  alkyl group.

20

In one embodiment, compounds of structure 3e are provided:





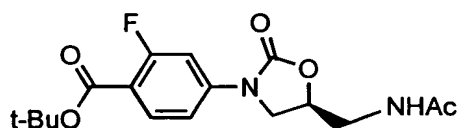
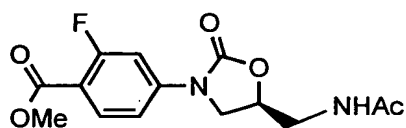
3e

wherein

R<sub>9</sub> is alkyl, aryl, heteroalkyl, or heteroaryl; and

5 R' is a substituent, for example, H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

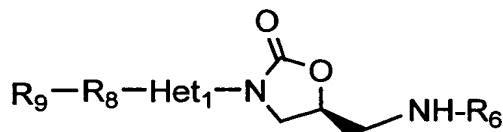
Exemplary compounds are shown below:



15 3-[(Substituted)heteroaryl] oxazolidinones

In another embodiment, a variety of 3-[(substituted)heteroaryl] oxazolidinones, which optionally are biologically active, for example, as antimicrobial compounds, are provided.

20 In one embodiment, compounds of the formula 4c, and combinatorial libraries thereof are provided:



4c

25 In one embodiment of 4c:

$R_6$  is acyl or sulfonyl;

Het<sub>1</sub> is heterocyclic group such as an unsubstituted or substituted heteroaryl group, such as thienylphenyl, thiazolyl, 1,3,4-thiadiazolyl, pyridinyl, or pyrimidinyl;

$R_8$  is C<sub>1</sub>-C<sub>7</sub> alkyl, NR, O, S, C(=O)NR, C(=O)NOR, NRC(=O), C(=O), C(=O)O, OC(=O), S(=O), SO<sub>2</sub>, SO<sub>2</sub>NR, NRSO<sub>2</sub>, NRCONR', or (CH<sub>2</sub>)<sub>n</sub>O, where n = 0-6, and R and R' are substituents, for example, independently, H, or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, e.g., heteroalkyl, aryl or heteroaryl; and

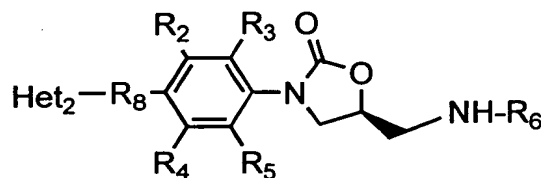
$R_9$  is alkyl, aryl, heteroalkyl, or heteroaryl.

In 4c, substituents on the heteroaryl group Het<sub>1</sub> are, for example, independently, hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN, NO<sub>2</sub>, NR''R''', OH, OR'', SR'', S(=O)R'', SO<sub>2</sub>R'', C(=O)R'', C(=O)OR'', OC(=O)R'', C(=O)NR''R''', N(R'')C(=O)R''', or N-oxide group in the Het<sub>1</sub> nuclei, and R'' and R''' are substituents, for example are independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, e.g., heteroalkyl, aryl or heteroaryl.

### 3-[4-(Linked heteroaryl)aryl] oxazolidinones

In a further embodiment, 3-[4-(linked heteroaryl)aryl] oxazolidinones are provided, which optionally have biological activity, for example, as antimicrobial compounds.

For example, compounds of the formula 5c, and combinatorial libraries thereof are provided:



5c

In one embodiment of 5c:

$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

5  $R_6$  is acyl or sulfonyl;

$R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $NRC(=O)$ ,  $C(=O)NOR$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , where  $n = 0-6$ , and R and R' are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl; and

10  $Het_2$  is a heterocyclic group, such as an unsubstituted or substituted heterocyclic group, such as an oxazolyl, isoxazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,3-oxadiazolyl, thienylphenyl, thiazolyl, isothiazolyl, 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, pyrrolyl, imidazolyl, pyrazolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, 1,2,3-triazinyl, 1,2,4-triazinyl, tetrazolyl, pyridinyl, pyrazinyl, pyrimidinyl, pyridazinyl, 1,2,4-triazinyl, 1,3,5-triazinyl, or 1,2,4,5-tetrazinyl;

15 wherein substituents in heteroaryl group  $Het_2$  are, for example, independently, hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN,  $NO_2$ ,  $NR''R'''$ , OH,  $OR''$ ,  $SR''$ ,  $S(=O)R''$ ,  $SO_2R''$ ,  $C(=O)R''$ ,  $C(=O)OR''$ ,  $OC(=O)R''$ ,  $C(=O)NR''R'''$ ,  $N(R'')C(=O)R'''$ , or N-oxide group in the  $Het_2$  nuclei, where  $R''$  and  $R'''$  are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

25 In another embodiment, 3-[4-(linked heteroaryl)aryl] oxazolidinones are provided, which optionally have antimicrobial activity, of formula 5c wherein:

$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

30  $R_6$  is acyl, for example,  $C(=O)CH_3$ ;

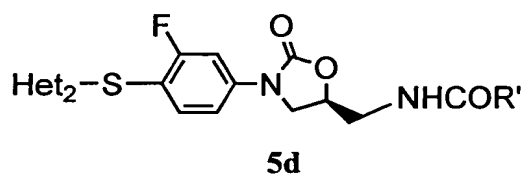
R<sub>7</sub> is an aryl group;

R<sub>8</sub> is a thio group, such as S; and

Het<sub>2</sub> is a substituted or unsubstituted thienylphenyl or thiazolyl heteroaryl group.

5

Also provided are compounds of structure 5d:



10

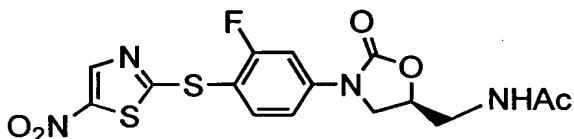
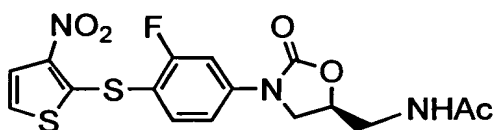
wherein

Het<sub>2</sub> is a substituted or unsubstituted thienylphenyl or thiazolyl heteroaryl group; and

R' is a substituent, for example, H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

15

Exemplary compounds are shown below:



20

In another embodiment, 3-[4-(triazinylamino)aryl] oxazolidinones are provided, which are optionally antimicrobial compounds. For example, compounds of formula 5c are provided wherein:

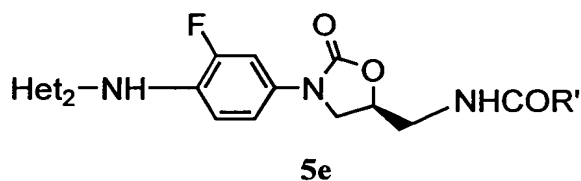
$R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$  are, independently, hydrogen, alkyl, heteroalkyl, heteroaryl or an electron withdrawing group;

$R_6$  is acyl, such as  $C(=O)CH_3$ ;

$R_8$  is amino group, such as  $NH$ ; and

Het<sub>2</sub> is 1,3,5-triazinyl.

Additionally, compounds of structure 5e are provided:

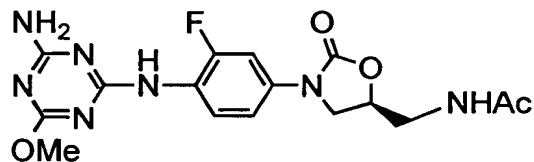
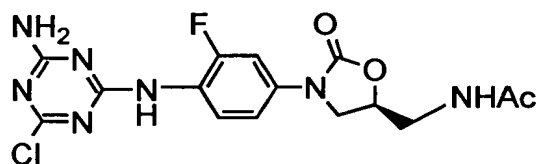


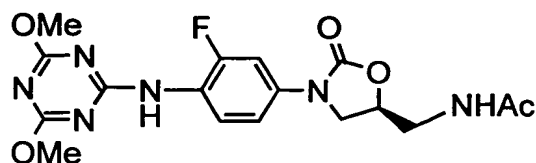
wherein

Het<sub>2</sub> is a unsubstituted or substituted 1,3,5-triazinyl; and

$R'$  is a substituent, for example, H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

Exemplary compounds are shown below:

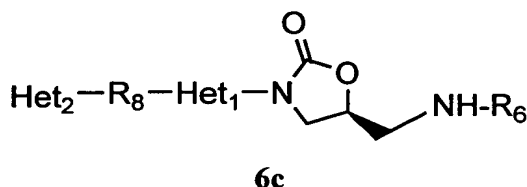




### 3-[4-(Linked heteroaryl)heteroaryl] oxazolidinones

In another embodiment, 3-[4-(linked heteroaryl)heteroaryl] oxazolidinones are provided, which are optionally biologically active, for example, as antimicrobial compounds.

For example, compounds of formula 6c, and combinatorial libraries thereof are provided:



In one embodiment of 6c:

R<sub>6</sub> is acyl or sulfonyl;

R<sub>8</sub> is C<sub>1</sub>-C<sub>7</sub> alkyl, NR, O, S, C(=O)NR, NRC(=O), C(=O)NOR, C(=O), C(=O)O, OC(=O), S(=O), SO<sub>2</sub>, SO<sub>2</sub>NR, NRSO<sub>2</sub>, NRCONR', or (CH<sub>2</sub>)<sub>n</sub>O, where n = 0-6, and R and R' are substituents, for example, independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

Het<sub>1</sub> is a heterocyclic group such as an unsubstituted or substituted heterocyclic group, for example, thienylphenyl, thiazolyl, 1,3,4-thiadiazolyl, pyridinyl, pyrimidinyl, phenyl or fluorophenyl;

wherein substituents in heteroaryl group Het<sub>1</sub> are independently, for example, hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN, NO<sub>2</sub>, NR''R''', OR'', SR'', S(=O)R'', SO<sub>2</sub>R'', C(=O)R'', C(=O)OR'', OC(=O)R'', C(=O)NR''R''', N(R'')C(=O)R''', or

N-oxide group in the Het<sub>1</sub> nuclei, where R'' and R''' are substituents, for example, independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl; and

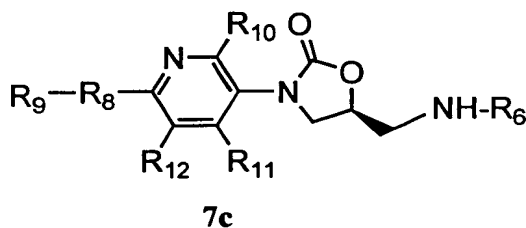
Het<sub>2</sub> is an unsubstituted or substituted heterocyclic preferably heteroaryl group, such as an oxazolyl, isoxazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,3-oxadiazolyl, thienylphenyl, thiazolyl, isothiazolyl, 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, pyrrolyl, imidazolyl, pyrazolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, 1,2,3-triazinyl, 1,2,4-triazinyl, tetrazolyl, pyridinyl, pyrazinyl, pyrimidinyl, pyridazinyl, 1,2,4-triazinyl, 1,3,5-triazinyl, or 1,2,4,5-tetrazinyl;

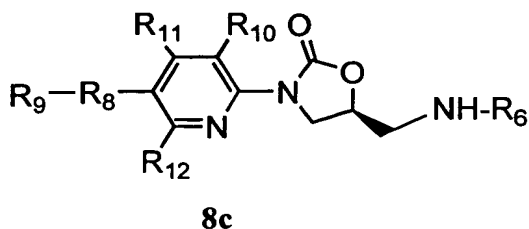
wherein substituents in heteroaryl group Het<sub>2</sub> are independently, for example, hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN, NO<sub>2</sub>, NR<sub>x</sub>R<sub>y</sub>, OH, OR<sub>x</sub>, SR<sub>x</sub>, S(=O)R<sub>x</sub>, SO<sub>2</sub>R<sub>x</sub>, C(=O)R<sub>x</sub>, C(=O)OR<sub>x</sub>, OC(=O)R<sub>x</sub>, C(=O)NR<sub>x</sub>R<sub>y</sub>, N(R<sub>x</sub>)C(=O)R<sub>y</sub>, or N-oxide group in the Het<sub>2</sub> nuclei, where R<sub>x</sub> and R<sub>y</sub> are substituents, for example, independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

### 3-(Substituted pyridyl)oxazolidinones

Also provided are 3-(substituted pyridyl)oxazolidinones, which are optionally biologically active, for example as antimicrobial compounds.

In one embodiment, compounds of the formulas 7c or 8c and combinatorial libraries thereof are provided:





5 In one embodiment, in **7c** and **8c**:

$R_6$  is acyl or sulfonyl;

$R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $C(=O)NOR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , wherein  $n = 0-6$ , and wherein R and R' are substituents, for  
 10 example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

$R_9$  is alkyl, aryl, heteroalkyl, or heteroaryl; and

$R_{10}$ ,  $R_{11}$  and  $R_{12}$  are, for example, independently hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN,  $NO_2$ ,  
 15  $NR''R'''$ ,  $OR''$ ,  $SR''$ ,  $S(=O)R''$ ,  $SO_2R''$ ,  $C(=O)R''$ ,  $C(=O)OR''$ ,  $OC(=O)R''$ ,  $C(=O)NR''R'''$ ,  $N(R'')C(=O)R'''$ , or N-oxide group in the pyridine nuclei, where  $R''$  and  $R'''$  are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

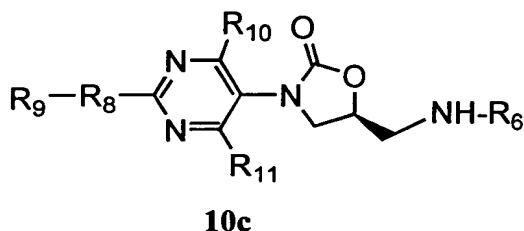
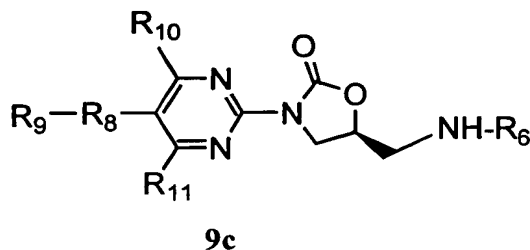
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### 3-(Substituted pyrimidinyl)oxazolidinones

A variety of 3-(substituted pyrimidinyl)oxazolidinones, which optionally have biological activity, such as antimicrobial activity, also are provided.

In one embodiment, compounds of the formulas **9c** and **10c**, as well as  
 25 combinatorial libraries thereof, are provided:





In one embodiment of **9c** and **10c**:

$R_6$  is acyl or sulfonyl;

$R_8$  is  $C_1$ - $C_7$  alkyl group, NR, O, S,  $C(=O)NR$ ,  $C(=O)NOR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , where  $n = 0-6$ , and where R and R' are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

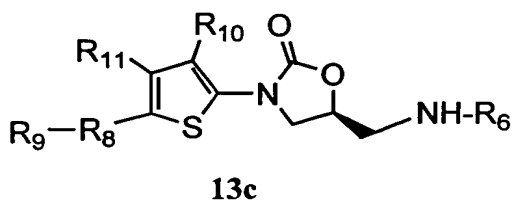
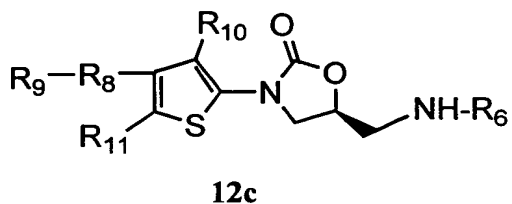
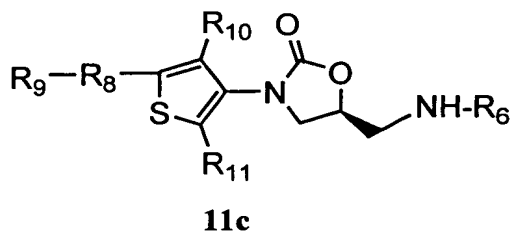
$R_9$  is alkyl, aryl, heteroalkyl, or heteroaryl; and

$R_{10}$  and  $R_{11}$  are independently hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN,  $NO_2$ ,  $NR''R'''$ ,  $OR''$ ,  $SR''$ ,  $S(=O)R''$ ,  $SO_2R''$ ,  $C(=O)R''$ ,  $C(=O)OR''$ ,  $OC(=O)R''$ ,  $C(=O)NR''R'''$ ,  $N(R'')C(=O)R'''$ , or N-oxide group in the pyrimidine nuclei, where  $R''$  and  $R'''$  are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

### 3-(Thienyl)oxazolidinones

A variety of 3-(thienyl)oxazolidinones are provided, which optionally have biological activity, such as antimicrobial activity.

In one embodiment, compounds of formulas **11c**, **12c** and **13c**, and combinatorial libraries thereof are provided:



In one embodiment of formulas **11c**, **12c** and **13c**:

$R_6$  is acyl or sulfonyl;

$R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $C(=O)NOR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , where  $n = 0-6$ , and where R and R' are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

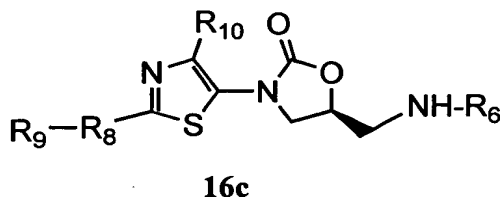
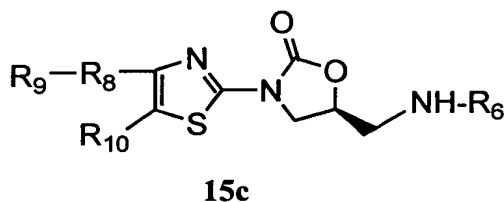
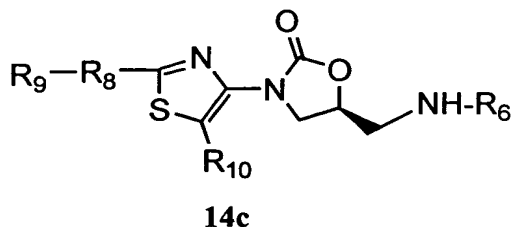
$R_9$  is an alkyl, aryl, heteroalkyl, or heteroaryl group; and

$R_{10}$  and  $R_{11}$  are independently hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN,  $NO_2$ ,  $NR''R'''$ ,  $OR''$ ,  $SR''$ ,  $S(=O)R''$ ,  $SO_2R''$ ,  $C(=O)R''$ ,  $C(=O)OR''$ ,  $OC(=O)R''$ ,  $C(=O)NR''R'''$ ,  $N(R'')C(=O)R'''$ , where  $R''$  and  $R'''$  are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

3-(Thiazolyl)oxazolidinones

Also provided are 3-(thiazolyl)oxazolidinones, which optionally have biological activity, such as antimicrobial activity.

5 In one embodiment, compounds of formulas **14c**, **15c** and **16c**, and combinatorial libraries thereof are provided:



In one embodiment of **14c**, **15c** and **16c**:

$R_6$  is acyl or sulfonyl;

20  $R_8$  is  $C_1$ - $C_7$  alkyl, NR, O, S,  $C(=O)NR$ ,  $C(=O)NOR$ ,  $NRC(=O)$ ,  $C(=O)$ ,  $C(=O)O$ ,  $OC(=O)$ ,  $S(=O)$ ,  $SO_2$ ,  $SO_2NR$ ,  $NRSO_2$ ,  $NRCONR'$ , or  $(CH_2)_nO$ , wherein  $n = 0-6$ , and wherein R and R' are substituents, for example, independently H or alkyl, such as  $C_1$ - $C_7$  alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl;

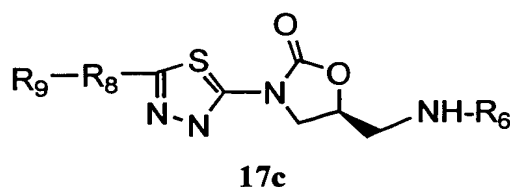
$R_9$  is an alkyl, aryl, heteroalkyl, or heteroaryl group; and

R<sub>10</sub> is hydrogen, alkyl, aryl, heteroalkyl, electron withdrawing group, F, Cl, CN, NO<sub>2</sub>, NR''R''', OR'', SR'', S(=O)R'', SO<sub>2</sub>R'', C(=O)R'', C(=O)OR'', OC(=O)R'', C(=O)NR''R''', or N(R'')C(=O)R''', where R'' and R''' are substituents, for example, independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl.

### 3-(1,3,4-Thiadiazolyl)oxazolidinones

A variety of 3-(1,3,4-thiadiazolyl)oxazolidinones are provided, which optionally have biological activity, such as antimicrobial activity.

In one embodiment, compounds of formula 17c and combinatorial libraries thereof are provided:



In one embodiment of 17c:

R<sub>6</sub> is acyl or sulfonyl;

R<sub>8</sub> is C<sub>1</sub>-C<sub>7</sub> alkyl, NR, O, S, C(=O)NR, C(=O)NOR, NRC(=O), C(=O), C(=O)O, OC(=O), S(=O), SO<sub>2</sub>, SO<sub>2</sub>NR, NRSO<sub>2</sub>, NRCONR', or (CH<sub>2</sub>)<sub>n</sub>O, where n = 0-6, and where R and R' are substituents, for example, independently H or alkyl, such as C<sub>1</sub>-C<sub>7</sub> alkyl, or, *e.g.*, heteroalkyl, aryl or heteroaryl; and

R<sub>9</sub> is alkyl, aryl, heteroalkyl, or heteroaryl.

### Synthesis of 3-(Heteroaryl)Oxazolidinones

3-(Heteroaryl)oxazolidinones and other oxazolidinones may be synthesized by a variety of routes as disclosed herein. In one embodiment, the synthesis may be conducted as shown in Figure 49, wherein the synthesis includes: reaction of an appropriate heteroaryl halide with 3-aminopropane-1,2-diol; cyclization of the resulting (heteroaryl)aminodiol with phosgene or equivalent; conversion of 5-(R)-hydroxymethyl-3-heteroaryloxazolidinone into

resin immobilized 5-(S)-aminomethyl-3-heteroaryl oxazolidinone. Further reaction of this reagent produces the desired oxazolidinone.

In another embodiment, which is illustrated in Figure 50, the 5-(S)-azidomethyl-3-heteroaryloxazolidinone reagent is produced from an appropriate heteroarylhalide and 5-(S)-azidomethyloxazolidinone or equivalent thereof in the presence of a base. The resulting azide or amine intermediate is then immobilized on a BAL linker resin. Further reaction of the X group and or the amine group attached to the solid phase provides an array of desired 3-heteroaryloxazolidinones.

As will be appreciated by those skilled in the art, using these and other methods disclosed herein, based on the teachings of the specification, the oxazolidinones disclosed herein can be readily synthesized.

#### Combinatorial Library Synthesis

Combinatorial library synthesis is typically performed on a solid support. See, for example, Lam et al. (1991) *Nature* 354:82-84; and Houghten et al. (1991) *Nature* 354:84-86. There are two general technologies for the construction of combinatorial libraries: "mix and split" technology and "multiple parallel synthesis" technology.

For the "mix and split" technology, a large number of beads or particles are suspended in a suitable carrier (such as a solvent) in a parent container. The beads, for example, are provided with a functionalized point of attachment for a chemical module. The beads are then divided and placed in various separate reaction vessels. The first chemical module is attached to the bead, providing a variety of differently substituted solid supports. Where the first chemical module includes 3 different members, the resulting substituted beads can be represented as  $A_1$ ,  $A_2$  and  $A_3$ .

The beads are washed to remove excess reagents and subsequently remixed in the parent container. This bead mixture is again divided and placed into various separate reaction vessels. The second chemical module is coupled to the first chemical module. Where the second chemical module includes 3 different members,  $B_1$ ,  $B_2$  and  $B_3$ , 9 differently substituted beads result:  $A_1B_1$ ,  $A_1B_2$ ,  $A_1B_3$ ,  $A_2B_1$ ,  $A_2B_2$ ,  $A_2B_3$ ,  $A_3B_1$ ,  $A_3B_2$  and  $A_3B_3$ . Each bead will have only a single type of molecule attached to its surface.

The remixing/redivision synthetic process can be repeated until each of the different chemical modules has been incorporated into the molecule attached to the solid support. Through this method, large numbers of individual compounds can be rapidly and efficiently synthesized. For instance, where there are 4  
5 different chemical modules, and where each chemical module contains 20 members, 160,000 beads of different molecular substitution can be produced.

Combinatorial library synthesis using the "mix and split" technology can be performed either manually or through the use of an automated process. For the manual construction of a combinatorial library, a scientist would perform the  
10 various chemical manipulations. For the construction of a combinatorial library through an automated process, the various chemical manipulations will typically be performed robotically. For example, see U.S. Patent No. 5,463,564.

For the "multiple parallel synthesis" technology, beads or particles are suspended in a suitable carrier (such as a solvent) in an array of reaction  
15 chambers. The beads or particles are provided with a functionalized point of attachment for a chemical module. Different members of a chemical module are added to each individual reaction chamber, providing an array of differently functionalized beads. Where there are 96 separate reaction chambers and 96 different chemical module members, a combinatorial library of 96 compounds is  
20 formed. The compounds can be assayed on the solid support, cleaved from the solid support and then assayed, or subjected to the addition of another chemical module.

Combinatorial library synthesis using the "multiple parallel synthesis" technology can be performed either manually or through the use of an automated  
25 process. For the manual construction of a combinatorial library, a scientist would perform the various chemical manipulations. For the construction of a combinatorial library through an automated process, the various chemical manipulations will typically be performed robotically.

### Solid Supports

The solid phase synthesis of the compositions provided herein in one embodiment is performed on a solid support. "Solid support" includes an insoluble substrate that has been appropriately derivatized such that a chemical module can be attached to the surface of the substrate through standard chemical methods. Solid supports include, but are not limited to, beads and particles such as peptide synthesis resins. For example, see Merrifield (1963) *J. Am. Chem. Soc.* 85:2149-2154; U.S. Patent No. 4,631,211; and Geysen *et al.* (1984) *Proc. Natl. Acad. Sci. USA* 81:3998-4002.

Solid supports can consist of many materials, limited primarily by the capacity of the material to be functionalized through synthetic methods. Examples of such materials include, but are not limited to, polymers, plastics, resins, polysaccharides, silicon or silica based materials, carbon, metals, inorganic glasses and membranes. Preferred resins include Sasrin resin (a polystyrene resin available from Bachem Bioscience, Switzerland), Wang resin or p-nitrophenylcarbonate Wang resin (PNP resin, Novabiochem), and TentaGel S AC, TentaGel PHB, or TentaGel S NH<sub>2</sub> resin (polystyrene-polyethylene glycol copolymer resins available from Rapp Polymere, Tubingen, Germany or from Perseptive, Boston).

The solid support can be purchased with suitable functionality already present such that a chemical module can be attached to the support surface (e.g., Novabiochem, Bachem Bioscience, Rapp Polymere). Alternatively, the solid support can be chemically modified such that a chemical module can be attached to the support surface. Grant (1992) *Synthetic Peptides. A User's Guide*, W.H. Freeman and Co.; and Hermkens *et al.* (1996) *Tetrahedron* 52:4527-4554. One of ordinary skill in the art will understand that the choice of functionality used for attaching a molecule to the solid support will depend on the nature of the compound to be synthesized and the type of solid support. Examples of functionality present on the solid support that can be used to attach a chemical module include, but are not limited to, alkyl or aryl halides, aldehydes, alcohols, carbonates, ketones, amines, sulfides, carboxyl groups, aldehyde groups and sulfonyl groups.

The functional group on the solid support that permits the attachment of a chemical module is, for example, an alcohol, an amine, an aldehyde, a carbonate, or a diol group. Gordon *et al.* (1994) *J. Med. Chem.* 37:1385-1401; and Hermkens *et al.* (1996) *Tetrahedron* 52:4527-4554.

For making certain combinatorial libraries, one can purchase a solid support with an existing, protected chemical module already attached. An example of such a support is FmocGly Sasrin, which is commercially available from Bachem. Typically, however, the first step of the combinatorial library synthesis is the attachment of a chemical module to the solid support through the existing functionality on the support surface. Examples of chemical reactions that can be used to attach a chemical module to the support include, but are not limited to, nucleophilic displacement of a halide or other leaving group, etherification of an alcohol, esterification of an alcohol, amidation of an amine, carbamation of an amine, reductive amination of a carbonyl compound, acetalization of an aldehyde and ketalization of a ketone. Hermkens *et al.* (1996) *Tetrahedron* 52:4527-4554.

The reaction used to attach the chemical module to the solid support is, for example, a carbamation of an amine, a reductive amination of a carbonyl compound or a nucleophilic displacement of a halide or other leaving group. For example, see Hermkens *et al.* (1996).

For the attachment of certain chemical modules to the solid support, it may be necessary to mask functionality that is not involved in the attachment process, but that is incompatible with the mode of attachment. A non-limiting example of this type of process is the esterification of an alcohol functionalized solid support, using a hydroxyl-substituted carboxylic acid as the coupling partner. Prior to the esterification reaction, the hydroxyl group of the carboxylic acid would be "protected" through alkylation, silylation, acetylation, or through another method known to one of skill in the art. Strategies for the use of masking or protecting groups have been well-described in the art, such as in Green (1985) *Protecting Groups in Organic Synthesis*, Wiley.

#### Methods of Compound Cleavage from a Solid Support

The cleavage of oxazolidinones from a solid support to produce the corresponding "free" compounds can be accomplished using a variety of methods.



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## Screening

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agent, such as guanidinium hydrochloride or urea, to cause release of the ligand from the enzyme. The solution is then injected onto an HPLC column (for example, a Vydac C-4 reverse-phase column, and eluted with a gradient of water and acetonitrile ranging from 0% acetonitrile to 80% acetonitrile). Diode array  
5 detection provides discrimination of the compounds of the combinatorial library from the enzyme. The compound peaks are then collected and subjected to mass spectrometry for identification.

An alternate manner of identifying compounds that inhibit an enzyme is to divide the library into separate sublibraries where one step in the synthesis is  
10 unique to each sublibrary. To generate a combinatorial library, reactants are mixed together during a step to generate a wide mixture of compounds. At a certain step in the synthesis, however, the resin bearing the synthetic intermediates is divided into several portions, with each portion then undergoing a unique transformation. The resin portions are then (separately) subjected to the rest of the  
15 synthetic steps in the combinatorial synthetic method. Each individual resin portion thus constitutes a separate sublibrary. When testing the compounds, if a given sublibrary shows more activity than the other sublibraries, the unique step of that sublibrary is then held fixed. The sublibrary then becomes the new library, with that step fixed, and forms the basis for another round of sublibrary synthesis,  
20 where a different step in the synthesis is optimized. This procedure is executed at each step until a final compound is arrived at. The aforementioned method is the generalization of the method described in Geysen, WO 86/00991, for determining peptide "mimotopes," to the synthetic method of this invention.

Finding a compound that inhibits an enzyme is performed most readily  
25 with free compound in solution. The compounds can also be screened while still bound to the resin used for synthesis; in some applications, this may be the preferable mode of finding compounds with the desired characteristics. For example, if a compound that binds to a specific antibody is desired, the resin-bound library of compounds is contacted with an antibody solution under  
30 conditions favoring a stable antibody-compound-resin complex. A fluorescently labeled second antibody that binds to the constant region of the first antibody is then contacted with the antibody-compound-resin complex. This allows

identification of a specific bead as carrying the compound recognized by the first antibody binding site. The bead is then physically removed from the resin mixture and subjected to mass spectral analysis. If the synthesis is conducted in a manner such that only one compound is likely to be synthesized on a particular bead, then the binding compound has been identified. If the synthesis is carried out so that many compounds are present on a single bead, the information derived from analysis can be utilized to narrow the synthetic choices for the next round of synthesis and identification.

The enzyme, antibody, or receptor target need not be in solution. Antibody or enzyme can be immobilized on a column. The library of compounds is then passed over the column, resulting in the retention of strongly binding compounds on the column after weaker-binding and non-binding compounds are washed away. The column is then washed under conditions that dissociate protein-ligand binding, which removes the compounds retained in the initial step. These compounds are then analyzed, and synthesized separately in quantity for further testing. Similarly, cells bearing surface receptors are contacted with a solution of library compounds. The cells bearing bound compounds are readily separated from the solution containing non-binding compounds. The cells are then washed with a solution which dissociates the bound ligand from the cell surface receptor. Again, the cells are separated from the solution, and the solution analyzed.

#### Pharmaceutical Compositions

The present invention also provides pharmaceutical compositions which comprise a bioactive oxazolidinone compound or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier. The compositions of the invention include those in a form adapted for oral, topical or parenteral use and can be used for the treatment of bacterial infection in mammals including humans.

The antibiotic compounds, also referred to herein as antimicrobial compounds, according to the invention can be formulated for administration in any convenient way for use in human or veterinary medicine, by analogy with other antibiotics. Such methods are known in the art and are not described in detail herein.

The composition can be formulated for administration by any route known in the art, such as subdermal, by-inhalation, oral, topical or parenteral. The compositions may be in any form known in the art, including but not limited to tablets, capsules, powders, granules, lozenges, creams or liquid preparations, such as oral or sterile parenteral solutions or suspensions.

The topical formulations of the present invention can be presented as, for instance, ointments, creams or lotions, eye ointments and eye or ear drops, impregnated dressings and aerosols, and may contain appropriate conventional additives such as preservatives, solvents to assist drug penetration and emollients in ointments and creams.

The formulations may also contain compatible conventional carriers, such as cream or ointment bases and ethanol or oleyl alcohol for lotions. Such carriers may be present, for example, from about 1% up to about 98% of the formulation. For example, they may form up to about 80% of the formulation.

Tablets and capsules for oral administration may be in unit dose presentation form, and may contain conventional excipients such as binding agents, for example syrup, acacia, gelatin, sorbitol, tragacanth, or polyvinylpyrrolidone; fillers, for example lactose, sugar, maize-starch, calcium phosphate, sorbitol or glycine; tableting lubricants, for example magnesium stearate, talc, polyethylene glycol or silica; disintegrants, for example potato starch; or acceptable wetting agents such as sodium lauryl sulphate. The tablets may be coated according to methods well known in normal pharmaceutical practice.

Oral liquid preparations may be in the form of, for example, aqueous or oily suspensions, solutions, emulsions, syrups or elixirs, or may be presented as a dry product for reconstitution with water or other suitable vehicle before use. Such liquid preparations may contain conventional additives, such as suspending agents, for example sorbitol, methyl cellulose, glucose syrup, gelatin, hydroxyethyl cellulose, carboxymethyl cellulose, aluminium stearate gel or hydrogenated edible fats, emulsifying agents, for example lecithin, sorbitan monooleate, or acacia; non-aqueous vehicles (which may include edible oils), for example almond oil, oily esters such as glycerine, propylene glycol, or ethyl

alcohol; preservatives, for example methyl or propyl p-hydroxybenzoate or sorbic acid, and, if desired, conventional flavoring or coloring agents.

For parenteral administration, fluid unit dosage forms are prepared utilizing the compound and a sterile vehicle, water being preferred. The compound, depending on the vehicle and concentration used, can be either suspended or dissolved in the vehicle or other suitable solvent. In preparing solutions, the compound can be dissolved in water for injection and filter sterilized before filling into a suitable vial or ampoule and sealing.

Advantageously, agents such as a local anesthetic preservative and buffering agents can be dissolved in the vehicle. To enhance the stability, the composition can be frozen after filling into the vial and the water removed under vacuum. The dry lyophilized powder is then sealed in the vial and an accompanying vial of water for injection may be supplied to reconstitute the liquid prior to use.

Parenteral suspensions are prepared in substantially the same manner except that the compound is suspended in the vehicle instead of being dissolved and sterilization cannot be accomplished by filtration. The compound can be sterilized by exposure to ethylene oxide before suspending in the sterile vehicle.

Advantageously, a surfactant or wetting agent is included in the composition to facilitate uniform distribution of the compound.

The compositions may contain, for example, from about 0.1% by weight, e.g., from about 10-60% by weight, of the active material, depending on the method of administration. Where the compositions comprise dosage units, each unit will contain, for example, from about 50-500 mg of the active ingredient. The dosage as employed for adult human treatment will range, for example, from about 100 to 3000 mg per day, for instance 1500 mg per day depending on the route and frequency of administration. Such a dosage corresponds to about 1.5 to 50 mg/kg per day. Suitably the dosage is, for example, from about 5 to 20 mg/kg per day.

#### Pharmaceutical Applications

The oxazolidinones disclosed herein can be used in a variety of pharmaceutical applications.

The compounds may be used, for example, as pharmaceutically active agents that act on the peripheral nerves, adrenergic receptors, cholinergic receptors, the skeletal muscles, the cardiovascular system, smooth muscles, the blood circulatory system, synaptic sites, neuroeffector junctional sites, endocrine and hormone systems, the immunological system, the reproductive system, the skeletal system, autocrine systems, the alimentary and excretory systems, the histamine system and central nervous systems as well as other biological systems. Thus, the compounds may be used as sedatives, psychic energizers, tranquilizers, anticonvulsants, muscle relaxants, anti-Parkinson agents, analgesics, antiinflammatories, local anesthetics, muscle contractants, antibiotic, antiviral, antiretroviral, antimalarials, diuretics, lipid regulating agents, antiandrogenic agents, antiparasitics, neoplastics, antineoplastics and chemotherapy agents. These compounds could further be used to treat cardiovascular diseases, central nervous system diseases, cancer, metabolic disorders, infections and dermatological diseases as well as other biological disorders and infections. The compounds also may be used as monoamine oxidase inhibitors.

In one embodiment, the compounds may be used as antimicrobial agents for the treatment of infectious disorders that are caused by microbial agents, such as bacteria.

In one embodiment, compositions, for treating or preventing infectious disorders are provided, comprising an oxazolidone compound as disclosed herein in combination with a pharmaceutically acceptable carrier.

In another embodiment, there is provided a dosage amount of an oxazolidinone as disclosed herein in an effective amount for the treatment, prevention or alleviation of a disorder, such as an infectious disorder.

Oxazolidinones can be screened for activity against different microbial agents and appropriate dosages may be determined using methods available in the art. Advantageously, the methods of making combinatorial libraries as disclosed herein permit large quantities of oxazolidinones to be made and screened against a wide variety of microbial agents to permit the rapid isolation of an effective oxazolidinone for a particular target microbe. The method also may be used to determine new oxazolidinones for use after and if bacterial resistance occurs.

The compounds may be used to treat a subject to treat, prevent, or reduce the severity of an infection. Subjects include animals, plants, blood products, cultures and surfaces such as those of medical or research equipment, such as glass, needles and tubing.

5 In one embodiment, methods of treating or preventing an infectious disorder in a subject, such as a human or other animal subject, are provided, by administering an effective amount of an oxazolidinone as disclosed herein to the subject. In one embodiment, the compound is administered in a pharmaceutically acceptable form optionally in a pharmaceutically acceptable carrier. As used  
10 herein, an "infectious disorder" is any disorder characterized by the presence of a microbial infection, such as bacterial infections. Such infectious disorders include, for example central nervous system infections, external ear infections, infections of the middle ear, such as acute otitis media, infections of the cranial sinuses, eye infections, infections of the oral cavity, such as infections of the teeth,  
15 gums and mucosa, upper respiratory tract infections, lower respiratory tract infections, genitourinary infections, gastrointestinal infections, gynecological infections, septicemia, bone and joint infections, skin and skin structure infections, bacterial endocarditis, burns, antibacterial prophylaxis of surgery, and antibacterial prophylaxis in immunosuppressed patients, such as patients receiving  
20 cancer chemotherapy, or organ transplant patients. The compounds and compositions comprising the compounds can be administered by routes such as topically, locally or systemically. Systemic application includes any method of introducing the compound into the tissues of the body, *e.g.*, intrathecal, epidural, intramuscular, transdermal, intravenous, intraperitoneal, subcutaneous, sublingual,  
25 rectal, and oral administration. The specific dosage of antimicrobial to be administered, as well as the duration of treatment, may be adjusted as needed.

The compounds of the invention may be used for the treatment or prevention of infectious disorders caused by a variety of bacterial organisms. Examples include Gram positive and Gram negative aerobic and anaerobic  
30 bacteria, including *Staphylococci*, for example *S. aureus*; *Enterococci*, for example *E. faecalis*; *Streptococci*, for example *S. pneumoniae*; *Haemophilus*, for example *H. influenza*; *Moraxella*, for example *M. catarrhalis*; and *Escherichia*,

for example *E. coli*. Other examples include *Mycobacteria*, for example *M. tuberculosis*; intercellular microbes, for example *Chlamydia* and *Rickettsiae*; and *Mycoplasma*, for example *M. pneumoniae*.

- 5           The following examples are provided to illustrate but not limit the claimed invention.



## EXAMPLES

Abbreviations: ACN, acetonitrile; CDI, carbonyldiimidazole; DIEA, diethylisopropylamine; DCM, dichloromethane; DIC, diisopropylidiimide; DMF, dimethylformamide; HATU, O-(7-azabenzotriazol-1-yl)-1,1,3,3-bis(tetramethylene)-uronium hexafluorophosphate; NMM, N-methyl morpholine; *m*CPBA, *m*-chloro-peroxybenzoic acid; TFA, trifluoroacetic acid; THF, tetrahydrofuran; TMOF, trimethylorthoformate.

General. Reagents were obtained from Aldrich (St. Louis, MO), Sigma (St. Louis, MO), Bachem Biosciences, Rapp Polymere, Perseptive, and Novabiochem, and used without further purification. The resin Tentagel S NTi was purchased from Rapp Polymere. Concentration of solutions after workup was performed by reduced pressure rotary evaporation, or using the Savant's SpeedVac instrument. Reactions with moisture-sensitive reagents were performed under nitrogen atmosphere.

Mass-spectra were obtained using ESI technique. HTLC analysis and purification were performed using Beckman System Gold R<sup>®</sup>; detection at 220 nm. Analytical EPLC was performed on YMC 5 micron C18 (4.6 mm x 50 mm) reverse phase column (gradient from 100% of the aq. 0.1% TFA to 100% of 0.1% TFA in MECN over 6 min', flow rate 2.0 mL/min). Preparative TLC was performed using EM silica gel 60 F<sub>254</sub> plates (20 x 20 cm, thickness 2 mm).

NMR spectra were obtained on a Varian Gemini 300 MHz instrument with CDCl<sub>3</sub> as solvent, unless otherwise noted. <sup>1</sup>H NMR spectra were reported as follows: chemical shift relative to tetramethylsilane (0.00 ppm), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, b = broad), coupling, and integration.

### 2-Fluoro-4-Nitrobenzoic Acid

Concentrated sulfuric acid (32 ml) was added carefully with stirring to a solution of 2-fluoro-4-nitrotoluene (16.5 g, 0.106 mol) in acetic acid (200 ml). The mixture was warmed up to 95 °C, and solution of chromium trioxide (37.1 g, 0.371 mol) in water (32 ml) was added dropwise with stirring over 2 h. The mixture was heated with stirring for another 30 minutes, allowed to cool down to

r.t., and poured into water (1000 ml). The product was extracted with diethyl ether (3 x 200 ml). Combined ether layers were washed with water and evaporated to dryness. The residue was dissolved in 10% aqueous potassium carbonate and washed with ether. The aqueous layer was acidified with con. HCl, and the resulting white precipitate filtered and dried (16.3 g, 83%), m.p. 174-177 °C. <sup>1</sup>H NMR.

Tert-Butyl 2-Fluoro-4-Nitrobenzoate

Thionyl chloride (45 ml, 0.62 mol) was added to 2-fluoro-4-nitrobenzoic acid (23.0 g, 0.124 mol), and the mixture was stirred under reflux for 2 h. Solvent was removed under vacuum, and the residue thoroughly dried under vacuum to give crystalline acid chloride (25.2 g, 99%). The acid chloride was dissolved in tetrahydrofuran (150 ml) under nitrogen, and 1M lithium tert-butoxide in tetrahydrofuran (136 ml, 0.136 mol) was added dropwise with stirring at room temperature. The mixture was stirred overnight, diluted with water (300 ml) and extracted with ether. The ether layer was washed with saturated aqueous sodium bicarbonate, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to gave the product as a white crystalline solid (24.2 g, 81%); mp 81-82 °C. <sup>1</sup>H NMR.

tert-Butyl-2-Fluoro-4-Aminobenzoate

*Tert*-butyl 2-fluoro-4-nitrobenzoate (24.2 g, 0.100 mol) was added to a warm (95 °C) solution of ammonium chloride (53.5 g, 1.00 mol), dissolved in ethanol (300 ml) and water (150 ml). Iron powder (325 mesh, 16.8 g, 0.300 mol) was added with stirring in small portions over ca. 1 h. The reaction mixture was stirred and heated at 95 °C for another 30 minutes and then filtered while still warm. The filter cake was washed thoroughly with excess ethanol. The filtrate and washings were diluted with water (1 L) and extracted with ether (3 X 150 ml). Combined ether extracts were washed with water and brine, dried (MgSO<sub>4</sub>), and evaporated to give the product as an off-white solid (21.1 g, 98%); mp 100-101 °C. <sup>1</sup>H NMR.

O-Benzyl-N-(3-fluoro-4-butoxycarbonylphenyl)carbamate

Benzyl chloroformate (15.9 ml, 0.112 mol) was added dropwise with stirring to a mixture of *tert*-butyl-2-fluoro-4-aminobenzoate (21.5 g, 0.102 mol)

and pyridine (16.5 ml, 0.204 mol) in dichloromethane (200 ml) at 0 °C. The reaction mixture was stirred for 30 minutes at 0 °C, allowed to warm up to room temperature, and then poured into water (ca. 300 ml). The organic layer was separated, washed with water, brine and dried (MgSO<sub>4</sub>). Evaporation gave a white solid, which was washed with hexane and dried under vacuum to afford the product (32.8 g, 93%); mp 117-118 °C. <sup>1</sup>H NMR.

5-(R)-Hydroxymethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

1M Lithium bis(trimethylsilyl)amide in tetrahydrofuran (104 ml, 0.104 mol) was added dropwise with stirring at -78 °C to a solution of O-benzyl-N-(3-fluoro-4-butoxycarbonylphenyl)-carbamate (32.8 g, 0.0948 mol) in tetrahydrofuran (150 ml). The mixture was stirred at -78 °C for 1 hour, and then (R)-glycidyl butyrate (15.0 g, 0.104 mol) was added dropwise with stirring. The mixture was allowed to warm to room temperature overnight, and was then quenched with saturated aqueous ammonium chloride (100 ml). The mixture was extracted with ethyl acetate, and the combined organic layers washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the crude product purified by silica gel column chromatography (eluent: 30% ethyl acetate in hexanes) to afford the product as a white solid (20.0 g, 68%); mp 148-149 °C. <sup>1</sup>H NMR.

5-(S)-Azidomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

Methanesulfonyl chloride (2.61 ml, 0.0337 mol) was added dropwise with stirring to a solution of 5-(R)-hydroxymethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (10.0 g, 0.0321 mol) and triethylamine (6.71 ml, 0.0482 mol) in dichloromethane (150 ml) at 0 °C over ca. 15 minutes. The reaction mixture was allowed to warm up to room temperature and then poured into water. The organic layer was separated, washed with water, saturated aq. NaHCO<sub>3</sub>, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford the mesylate intermediate as an oil (11.6 g, 99%). A mixture of the mesylate (13.4 g, 0.0370 mol) and sodium azide (12.0 g, 0.185 mol) in DMF (130

ml) was heated with stirring at 75 °C for 12 h. The reaction mixture was cooled to room temperature, diluted with water (300 ml), and extracted with ethyl acetate (3 x 100 ml). Combined organic layers were washed with water and brine, dried (MgSO<sub>4</sub>) and evaporated. The residue was washed with diethyl ether to give the pure azide as a white solid (9.76 g, 90.5%); mp 91-92 °C. <sup>1</sup>H NMR.

S-(S)-Azidomethyl-3-[4'-N-methyl-N-methoxyamido-3'-fluorophenyl]oxazolidine-2-one

5-(S)-Azidomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (3.36 g, 0.01 mol) is dissolved in dichloromethane (ca. 100 ml), and trifluoroacetic acid (50 ml) added with stirring. The mixture is kept at room temperature for 3-4 h, solvent removed under vacuum, and residue washed with diethyl ether-hexanes (1: 3, ca. 20 ml) to afford an intermediate acid. The acid (1.40 g, 0.005 mol) is dissolved in dichloromethane (100 ml) and dimethylformamide (50 ml), and 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (0.96 g, 0.005 mol) added. The mixture is stirred for ca. 2 h, and N-methyl-N-methoxyamine hydrochloride (0.48 g, 0.005 mmol) added, followed by triethylamine (1.5 ml, 0.015 mmol). The mixture is stirred at room temperature for 3-4 h, poured into water (ca. 200 ml), and extracted with ethyl acetate (3 x 150 ml). Combined organic layers are washed with water (4 x 250 ml), brine, and dried (MgSO<sub>4</sub>). Solvent is removed under vacuum to afford the Weinreb amide.

2-Fluoro-4-nitrobenzylidene diacetate

2-Fluoro-4-nitrotoluene (21.65 g, 0.140 mol) was dissolved in acetic anhydride (145 ml) and concentrated sulfuric acid (30 ml) was added slowly with stirring. The mixture was cooled to 0 °C, and a solution of chromium trioxide (42.0 g, 0.420 mol) in acetic anhydride (200 ml) added at such a rate that the temperature did not exceed 10 °C. The reaction mixture was stirred at 0 °C for another 2 h, and then poured into ice water (1000 ml). The resulting precipitate was filtered, washed with water and then dissolved in ethyl acetate. The ethyl acetate solution was washed with saturated aq. sodium bicarbonate, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford the product as a white crystalline solid (37.9 g, 70 %); mp 116-117 °C. <sup>1</sup>H NMR.

### 2-Fluoro-4-nitrobenzaldehyde Dimethyl Acetal

2-Fluoro-4-nitrobenzylidene diacetate (9.30 g, 0.0343 mol) was dissolved in methanol (200 ml), and potassium carbonate (4.74 g, 0.0343 mol) was added in one portion. The mixture was stirred at room temperature for 2 h and then  
 5 evaporated to dryness. The residue was dissolved in diethyl ether, washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford an aldehyde intermediate (5.68 g, 98 %). The aldehyde (6.00 g, 0.0355 mol) was dissolved in a mixture of methanol (4.5 ml) and trimethyl orthoformate (4.27 ml, 0.0390 mol). Ammonium chloride (0.10 g, 0.00178 mol) was added, and the  
 10 mixture was refluxed for 2 h. Solvent was removed under vacuum, and the residue was washed with diethyl ether. The resulting ether solution was washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford the product as a colorless oil. Yield 7.60 g (99 %). <sup>1</sup>H NMR.

### 4-Amino-3-fluorobenzaldehyde Dimethyl Acetal

2-Fluoro-4-nitrobenzaldehyde dimethyl acetal (0.59 g, 2.74 mmol) was dissolved in methanol: (20 ml), and 5% palladium on carbon (0.059 g) was added. The flask was charged with hydrogen gas, and the mixture was stirred at room temperature for 20 h. The catalyst was filtered through Celite, and solvent was removed under vacuum to afford the product. Yield 0.40 g (78 %). <sup>1</sup>H NMR.

### O-Benzyl-N-[3-fluoro-4-(dimethoxymethyl)phenyl]carbamate

Benzyl chloroformate (0.34 ml, 2.38 mmol) was added dropwise with stirring to a solution of 4-amino-3-fluorobenzaldehyde dimethyl acetal (0.40 g, 2.16 mmol) and pyridine (0.26 ml, 3.24 mmol) in dichloromethane (10 ml) at 0 °C. The reaction mixture was allowed to warm to room temperature, and was  
 25 washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to give the desired product as a white solid. Yield 0.56 g (81%). <sup>1</sup>H NMR.

### S-(R)-Hydroxymethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]oxazolidine-2-one

1 M Lithium bis(trimethylsilyl)amide in tetrahydrofuran (0.86 ml, 0.941 mmol) was added dropwise with stirring at -78 °C to O-benzyl-N-[3-fluoro-4-(dimethoxymethyl)-phenyl]carbamate (0.273 g, 0.855 mmol) in tetrahydrofuran (5

ml). The mixture was stirred at -78 °C for 1 h, and then (R)-glycidyl butyrate (0.145 ml, 1.03 mmol) was added dropwise with stirring. The mixture was allowed to warm to room temperature overnight, and was then quenched with saturated aq. ammonium chloride (5 ml). The mixture was extracted with ethyl acetate, and the product was washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed in vacuum, and the crude product purified by silica gel column chromatography (eluent: 30 % ethyl acetate in hexanes) to give the alcohol as an oil. Yield 0.24 g, 99%. <sup>1</sup>H NMR.

5-(S)-Azidomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]oxazolidine-2-one

Methanesulfonyl chloride (0.0664 ml, 0.858 mmol) was added with stirring to a solution of S-(R)-hydroxymethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]oxazolidine-2-one (0.233 g, 0.817 mmol) and triethylamine (0.228 ml, 1.63 mmol) in dichloromethane (10 ml) at 0 °C. The reaction was allowed to warm to room temperature, and was then poured into water. The organic layer was separated and washed with water, saturated aq. NaHCO<sub>3</sub>, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to give a mesylate intermediate as an oil (0.246 g, 83%). A mixture of the mesylate (0.189 g, 0.520 mmol) and sodium azide (0.170 g, 2.60 mmol) in DMF (5 ml) was heated at 75 °C for 12 h. The reaction was cooled to room temperature, diluted with water (50 ml) and extracted with ethyl acetate (3 x 30 ml). The combined organic layers were washed with water, brine, and then dried (MgSO<sub>4</sub>). Solvent was removed in vacuum, and the crude product was purified by silica gel column chromatography (eluent: 50% ethyl acetate in hexanes) to give the desired product as a colorless oil (0.154 g, 95%). MS (m/z): 311 [M + H]<sup>+</sup>. <sup>1</sup>H NMR.

3-Fluoro-4-thiocyananiline

N-Bromosuccinimide (1.76 g, 9.89 mmol) and potassium thiocyanate (1.75 g, 18.0 mmol) in methanol (30 ml) were stirred for 15 minutes at room temperature. The reaction mixture was cooled to 0 °C, and 3-fluoroaniline (1.00 g, 9.0 mmol) was added dropwise. The mixture was stirred at 0 °C for 2 h. Solvent was removed under vacuum, and the residue was washed with dichloromethane. The mixture was filtered to remove succinimide by-product,

and the solution was washed with water, brine, and dried ( $\text{MgSO}_4$ ). Solvent was removed under vacuum to afford the desired product as a colorless oil. Yield 1.45 g (96%).  $^1\text{H}$  NMR.

O-Benzyl-N-[3-fluoro-4-(thiocyano)phenyl]carbamate

Benzyl chloroformate (1.87 ml, 13.1 mmol) was added to a mixture of 3-fluoro-4-thiocyananiline (2.00 g, 11.9 mmol) and pyridine (2.12 ml, 26.2 mmol) in dichloromethane (30 ml) at 0 °C. The mixture was stirred for 30 minutes at 0 °C, allowed to warm to room temperature, and then poured into water. The organic layer was separated, washed with brine, and dried ( $\text{MgSO}_4$ ). Solvent was removed under vacuum. The crude product was washed with ether-hexanes and dried under vacuum to afford the desired product. Yield 3.64 g (92%); m.p. 74-75 °C.  $^1\text{H}$  NMR.

O-Benzyl-N-[3-fluoro-4-(triphenylmethylthio)phenyl]carbamate

Sodium sulfide nonahydrate (0.794 g, 3.31 mmol) in water (3 ml) was added dropwise at room temperature to a solution of O-benzyl-N-[3-fluoro-4-(thiocyano)phenyl]carbamate (1.00 g, 3.31 mmol) in ethanol (10 ml). The reaction mixture was stirred at room temperature for 30 minutes, and then triphenylmethyl bromide (1.07 g, 3.31 mol) in 1,4-dioxane (5 ml) was added dropwise. The reaction was stirred overnight. Organic solvent was removed under vacuum, and the residue taken up in ethyl acetate. The solution was washed with water, brine, and dried ( $\text{MgSO}_4$ ). Solvent was removed under vacuum, and the crude product purified by silica gel column chromatography (eluent: 10% ethyl acetate in hexanes) to give the desired compound as a white solid. Yield 1.10 g, (64%); mp 152-153 °C.  $^1\text{H}$  NMR.

5-(R)-Hydroxymethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one

1M Lithium bis(trimethylsilyl)amide in tetrahydrofuran (54 mL, 69.9 mmol) was added dropwise with stirring at -78 °C to a solution of O-benzyl-N-[3-fluoro-4-(triphenylmethylthio)phenyl]carbamate (33.0 g, 63.5 mmol) in tetrahydrofuran (250 ml). The mixture was stirred at -78 °C for 1 hour, and then (R)-glycidyl butyrate (11.0 g, 76.2 mmol) was added dropwise with stirring. The mixture was allowed to warm up to room temperature overnight, and then

quenched with saturated aqueous ammonium chloride (125 ml). The mixture was extracted with ethyl acetate, and combined organic layers washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the crude product purified by silica gel column chromatography (gradient from 30% to 75% of ethyl acetate in hexane) to afford the product. TLC: R<sub>f</sub> 0.2 (ethyl acetate-hexanes 1:1). MS 486 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Azidomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one

Methanesulfonyl chloride (3.91 mL, 50.6 mmol) was added dropwise with stirring to a solution of 5-(R)-hydroxymethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one (23.4 g, 48.2 mmol) and triethylamine (10.1 mL, 73.8 mmol) in dichloromethane (200 mL) at 0 °C over ca. 10 minutes. The reaction mixture was allowed to warm up to room temperature and then poured into water. The organic layer was separated, washed with water, saturated aq. NaHCO<sub>3</sub>, brine, and dried (MgSO<sub>4</sub>). Solvent is removed under vacuum to afford the mesylate intermediate as an oil (27.2 g, 99%). The mesylate (27.2 g, 48.2 mmol) and sodium azide (15.7 g, 241.0 mmol) in DMF (150 ml) was heated with stirring at 70 °C for 12 h. The reaction mixture was cooled to room temperature, diluted with water (750 mL), and extracted with ethyl acetate. Combined organic layers were washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum and the crude product purified by silica gel column chromatography (eluent: 30% ethyl acetate in hexanes) to afford the azide product as a white solid. Yield 18.1 g (73%). M.p. 77-79 °C. [α]<sub>D</sub><sup>20</sup> = -114 ° (c = 1, methanol). <sup>1</sup>H NMR.

5-Benzylloxycarbonylaminoindazole

Benzyl chloroformate (9.9 ml, ca. 66 mmol) in tetrahydrofuran (66 ml) was added dropwise with stirring to 5-aminoindazole (4.44 g, 33 mmol) in tetrahydrofuran (150 ml) and pyridine (12.0 ml, 150 mmol) at -5 °C. The mixture was allowed to warm to room temperature, stirred for 4 h, and concentrated under vacuum. Ethyl acetate (100 ml) and water (150 ml) were added, and the aqueous layer was extracted with ethyl acetate (2 x 100 ml). The combined organic layers were washed with 0.3 N aq. HCl (2 x 100 ml), water, brine, and dried (MgSO<sub>4</sub>).



Solvent was removed under vacuum to afford the crude product as a mixture of two regioisomers. MS (m/z): 402.1 [M+H]<sup>+</sup>. 0.3 M lithium hydroxide monohydrate in methanol (250 ml, ca. 75 mmol) was added. The mixture was stirred at room temperature for 45 min and then carefully acidified with 6 N aq. HCl until the pH of the solution was 2. The resulting product was filtered off, washed with water and dried under vacuum to afford the desired compound. R<sub>f</sub> 4.2 min. MS (m/z): 268.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-Benzyloxycarbonylamino-1-triphenylmethylindazole

5-Benzyloxycarbonylaminoindazole (0.534 g, 2 mmol) was stirred with trityl chloride (0.556 g, 2 mmol) and tetrabutylammonium iodide (0.074 g, 0.2 mmol) in tetrahydrofuran (5 ml) and triethylamine (0.42 ml, 3 mmol) for 3 days at room temperature. Solvent was removed under vacuum, and the solid residue was triturated with methanol (3 ml). The solid was washed with a mixture of methanol-water (5:1, ca. 15 ml) and dried under vacuum to afford the desired product. Yield 0.73 g (72%). <sup>1</sup>H NMR.

5-[5-(R)-Hydroxymethyloxazolidine-2-one-3-yl]-1-triphenylmethylindazole

1 M Lithium bis(trimethylsilyl)amide in tetrahydrofuran (1.1 mL, 1.1 mmol) was added dropwise with stirring at -78 °C to 5-benzyloxycarbonylamino-1-tritylindazole (0.510 g, 1 mmol) in tetrahydrofuran (10 mL) under nitrogen atmosphere. The mixture was stirred at -78 °C for 1.5 h. (R)-Glycidyl butyrate (0.160 mL, 1.2 mmol) was added dropwise with stirring. The mixture was allowed to warm to r.t. overnight. Saturated aq. NH<sub>4</sub>Cl (10 mL) was added, and the mixture was extracted with EtOAc (2 x 20 mL). The combined organic layers were washed with water (10 mL), brine (10 mL), and dried (MgSO<sub>4</sub>). Solvent was evaporated to 3 mL, and the residue was triturated with hexanes (50 mL). White crystalline product was filtered off, washed with hexanes, and dried in vacuo. Yield 0.440 g (93%). MS (m/z): 232.1 [M-Trt]<sup>+</sup>. <sup>1</sup>H NMR.

5-[5-(S)-Azidomethyloxazolidine-2-one-3-yl]-1-triphenylmethylindazole

Methanesulfonyl chloride (0.066 ml, 0.85 mmol) was added dropwise with stirring to a solution of 5-[5-(R)-hydroxymethyloxazolidine-2-one-3-yl]-1-triphenylmethylindazole (0.300 g, 0.63 mmol) and triethylamine (0.18 ml, 1.3

mmol) in dichloromethane (7.0 ml) at - 30 °C over 5 minutes. The reaction mixture was stirred at 5 °C for 2 h and quenched with water (15 ml). Ethyl acetate (20 ml) was added, and the organic layer was washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford a mesylate intermediate.

5 The mesylate and sodium azide (0.205 g, 3.15 mmol) in DMF (4 ml) was heated with stirring at 75 °C for 4 h. The reaction mixture was cooled to room temperature, diluted with water (ca. 10 ml), and extracted with ethyl acetate (2 x 15 ml). The combined organic layers were washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford the desired product as

10 off-white crystals. Yield 0.31 g (95%). MS (m/z): 257.1 [M-Trt]. <sup>1</sup>H NMR.

#### BAL Aldehyde Resin

4-(4-Formyl-3,5-dimethoxyphenoxy)butyric acid (9.33 g, 34.8 mmol), pyridine (15 ml), and diisopropylcarbodiimide (3.00 ml, 19.1 mmol) in dichloromethane (135 ml) were stirred at room temperature for 1 h. Tentagel S-

15 NH, resin (Rapp Polymere, 0.29 mmol/g, 8.7 mmol) was added, and the mixture was agitated at room temperature overnight. The resin was filtered, washed liberally with MeOH and dichloromethane and dried under vacuum.

#### 5-[5-(S)-Acetamidomethyloxazolidine-2-one-3-yl]-l-indazole

Tetrahydrofuran (1.0 mL) was added to the mixture of 5-[5-(S)-

20 azidomethyloxazolidine-2-one-3-yl]-l-triphenylmethylandazole (0.065 g, 0.13 mmol, ca. 3 eq. with respect to the resin reagent), triphenylphosphine (0.034 g, 0.13 mmol), and BAL aldehyde resin (150 mg, ca. 0.044 mmol). The mixture was stirred at r.t. for 2 h. A rubber septum was replaced with a teflon-coated cap, and the mixture was agitated at 75 °C for ca. 10 h. A tetrahydrofuran-

25 triethylorthoformate mixture (1:1, 1 mL) was added to the resulting imine resin, followed by 0.5 M NaBH<sub>3</sub>CN (0.5 mL, 0.25 mmol). The mixture was agitated at room temperature for 3 h. The resulting amine resin was washed liberally with MeOH and dichloromethane, and dried under vacuum. An acetic anhydride-

30 pyridine-dichloromethane solution (1 to 1.5 to 3, 4 mL) was added, and the mixture was agitated for 2 h (until negative ninhydrine test indicated completion of the acylation). The trityl protection was removed by treatment with 1% TFA in DCM (2 x 4 mL, 15 min), and the product was cleaved with 60% TFA in DCM (2

mL) over 2 h. HPLC purity for the cleaved product was 90% ( $R_t$  2.95 min).

Solvent was removed under vacuum, and the product was purified by preparative silica gel TLC (eluent: dichloromethane-MeOH 5:1). Yield 7.0 mg (58%).  $R_f$  2.9 min. (given below). MS ( $m/z$ ): 275.1  $[M+H]^+$ .  $^1H$  NMR.

5                    BAL Resin Immobilized 5-(S)-Aminomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]-oxazolidine-2-one

Triphenylphosphine (0.130 g, 0.496 mmol) was added to a mixture of BAL aldehyde resin (0.57 g, 0.165 mmol) and 5-(S)-azidomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]-oxazolidine-2-one (0.154 g, 0.496 mmol) in THF (3 ml) at room temperature. The mixture was stirred at room temperature for 2 h, and then at 75°C for 16 h. The mixture was cooled to room temperature, and 1M sodium cyanoborohydride in THF (0.99 ml, 0.992 mmol) was added in one portion. The reaction mixture was agitated for 8 h. The resulting amine resin was washed liberally with methanol and dichloromethane and dried under vacuum.

15                    BAL Resin Immobilized 5-(S)-Acetamidomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]-oxazolidine-2-one

Acetic anhydride-pyridine-dichloromethane solution (1 to 1.5 to 3, 4 mL) was added to BAL resin immobilized 5-(S)-aminomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]-oxazolidine-2-one, and the mixture was agitated for ca. 2 h (until negative ninhydrine test indicated completion of the acylation). The resin was filtered, washed liberally with methanol and dichloromethane and dried under vacuum.

5-(S)-Acetamidomethyl-3-[4'-formyl-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-dimethoxymethyl-3'-fluorophenyl]-oxazolidine-2-one (0.100 g, 0.029 mmol) was suspended in 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The mixture was filtered, and supernatant was evaporated under vacuum to give the crude product. The crude product was purified by preparative HPLC to afford the desired product as an oil. Yield 4.9 mg, (60%).  $R_f$  3.0 min. MS ( $m/z$ ): 281.1  $[M+H]^+$ .  $^1H$  NMR.

BAL Resin Immobilized 5-(S)-Aminomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Triphenylphosphine (7.61 g, 29.0 mmol) was added to a mixture of BAL aldehyde resin (33.3 g, 9.67 mmol) and 5-(S)-azidomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one (9.76 g, 29.0 mmol) in tetrahydrofuran (170 ml) under nitrogen at room temperature. The mixture was agitated at room temperature for 2 h and then at 75 °C for 16 h. The mixture was cooled to room temperature, and 1 M sodium cyanoborohydride in THF (58.0 ml, 58.0 mmol) was added in one portion. The reaction mixture was agitated for 8 h. The resulting amine resin was filtered, washed liberally with methanol and dichloromethane, and dried under vacuum.

BAL Resin Immobilized 5-(S)-Aminomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one

A mixture of 1 M chlorotrimethylsilane in dichloromethane (290 ml, 0.29 mol) and 1M phenol in dichloromethane (290 ml, 0.29 mol) was added to BAL resin immobilized 5-(S)-aminomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one, and the reaction mixture was agitated at room temperature for 36 h. The resulting acid resin was filtered, washed liberally with methanol and dichloromethane, and dried under vacuum.

General Procedure for the Synthesis of Immobilized 5-(S)-Acylaminomethyl-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-ones

A selected carboxylic acid (18.0 mmol), pyridine (1.46 ml, 18.0 mmol) and diisopropylcarbodiimide (1.35 ml, 9.90 mmol) in a mixture of dimethylformamide-dichloromethane (4:1, 8 ml) were stirred at room temperature for 1 h. An appropriate BAL resin immobilized 5-(S)-aminomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (1.80 mmol) was added and the mixture was agitated at room temperature for 16 h (or until ninhydrine test indicated a completion of the acylation). The resin was filtered, washed liberally with dimethylformamide, MeOH, dichloromethane, and dried under vacuum.

5-(S)-Acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one

Acetic anhydride-pyridine-dichloromethane solution (1:1.5:3, 200 mL) was added to an immobilized 5-(S)-acylaminomethyl-3-[4'-carboxy-3'-

fluorophenyl]-oxazolidine-2-one (33.3 g, 9.67 mmol), and the mixture was agitated overnight. The resin was filtered, washed liberally with methanol and dichloromethane and dried under vacuum. The acylated resin (0.100 g, 0.029 mmol) was suspended in 60% trifluoroacetic acid in dichloromethane for 2 h at room temperature. The mixture was filtered, and the supernatant was evaporated under vacuum to give a white solid which was washed with ether and dried under vacuum. Yield 7.6 mg (88%); mp 252-253 °C. <sup>1</sup>H NMR.

BAL Resin Immobilized 5-(S)-Acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Pentafluorophenyl trifluoroacetate (7.10 ml, 41.3 mmol) was added to a mixture of BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (20.4 g, 5.90 mmol) and pyridine (8 ml) in N-methylpyrrolidine-2-one (35 ml). The reaction mixture was agitated at room temperature for 16 h. The resin was filtered, washed with N-methylpyrrolidine-2-one and dichloromethane, and dried under vacuum. The resin was analyzed by cleavage with 60% trifluoroacetic acid in dichloromethane (2 ml per 0.100 g. 0.029 mmol of the resin, 2 h). The resulting supernatant was evaporated under vacuum to give the released pentafluorophenyl ester as a white solid. The solid was purified by preparative TLC (eluent 10% MEOH in dichloromethane). Yield 8.0 mg (60%); m.p. 172-173 °C. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(4''-morpholinophenylamino)carbonyl-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.100g, 0.029 mmol) was agitated with 4-morpholinoaniline (0.155 mg, 0.87 mmol) in 10% pyridine in dimethylformamide (2 ml) for 24 h. The resin was filtered and washed liberally with dimethylformamide, MeOH, DCM, and dried under vacuum. The dry resin was cleaved in 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The supernatant was evaporated under vacuum, and the crude product was purified by preparative TLC (eluent: 10% methanol in dichloromethane to give product as a white solid. Yield 6.6 mg (50%). MS (m/z): 457.2 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(3''-pyridylamino)carbonyl-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.100g, 0.029 mmol) was agitated with 3-aminopyridine (0.082 mg, 0.87 mmol) in 10% pyridine in dimethylformamide (2 ml) for 24 h. The resin was filtered and washed liberally with dimethylformamide, MeOH, DCM, and dried under vacuum. The dry resin was cleaved in 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The supernatant was evaporated under vacuum, and the crude product was purified by preparative TLC (eluent: 10% methanol in dichloromethane) to give the product as a white solid. Yield 4.3 mg (40%). MS(m/z): 373.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(4''-morpholino)carbonyl-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.100g, 0.029 mmol) was agitated with morpholine (0.10 ml, 0.116 mmol) in N-methylpyrrolidine-2-one (2 ml) for 16 h. The resin was filtered and washed liberally with N-methylpyrrolidine-2-one, MeOH, dichloromethane, and dried under vacuum. The dry resin was cleaved in 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The resin was filtered, the filtrate evaporated under vacuum, and the crude product was purified by preparative TLC (eluent: 10% MeOH in dichloromethane) to give the product as a white solid. Yield 5.6 mg (53%); m.p. 210-211 °C. <sup>1</sup>H NMR.

BAL Resin Immobilized Weinreb Amide: 5-(S)-Acetamidomethyl-3-[4'-N-methoxy-N-methylaminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (1.00 g, 0.29 mmol) was agitated with N-methoxy-N-methylamine hydrochloride (0.59 g, 6.0 mmol) and triethylamine (0.84 ml, 6.0 mmol) in N-methylpyrrolidine-2-one for 16 h at room temperature. The resin was filtered, washed liberally with N-methylpyrrolidine-2-one, MeOH, dichloromethane, and dried under vacuum. A

small portion of the resin (ca. 10 mg) was cleaved in 60% trifluoroacetic acid in dichloromethane (0.20 ml) for 2 h at room temperature. The supernatant was concentrated under vacuum to afford the cleaved Weinreb amide as an oil.  $R_f$  2.8 min. MS (m/z): 340.1  $[M + H]^+$ .  $^1H$  NMR.

5                    BAL Resin Immobilized Aldehyde 5-(S)-Acetamidomethyl-3-[4'-formyl-3'-fluorophenyl]-oxazolidine-2-one

0.1 M Lithium aluminum hydride in tetrahydrofuran (0.52 ml) was added dropwise with stirring to BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-N-methoxy-N-methylaminocarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.150 g, 0.044 mmol) in tetrahydrofuran (2 ml) at -78 °C. The mixture was agitated at -78 °C for 4-6 h. It was then allowed to warm to room temperature overnight. The resin was filtered, washed liberally with tetrahydrofuran, MeOH, dichloromethane, and dried under vacuum.  $^1H$  NMR.

15                    5-(S)-Acetamidomethyl-3-[4'-formyl-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-formyl-3'-fluorophenyl]-oxazolidine-2-one (0.150 g, 0.0435 mol) was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. Supernatant was evaporated under vacuum to give the crude product as an oil. MS (m/z): 281.1  $[M + H]^+$ .  $^1H$  NMR.

20                    5-(S)-Acetamidomethyl-3-[4'-acetyl-3'-fluorophenyl]oxazolidine-2-one

3.0 M Methylmagnesium iodide in diethyl ether (0.022 ml, 0.066 mmol) is added dropwise with stirring to BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-N-methoxy-N-methylaminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one (0.150 g, 0.044 mmol) in tetrahydrofuran (2 ml) at -78 °C. The mixture is agitated at 78 °C for 5-10 h, and then allowed to warm to room temperature overnight. The resin is filtered, washed liberally with tetrahydrofuran, MeOH, dichloromethane, and dried under vacuum. The resulting ketone resin is cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The supernatant is evaporated under vacuum to afford the desired product.

BAL Resin Immobilized Acyl Azide 5-(S)-Acetamidomethyl-3-[4'-azidocarbonyl-3'-fluorophenyl]oxazolidine-2-one

Method A: with azidotrimethylsilane and tetrabutylammonium fluoride. 1 M Tetrabutylammonium fluoride in tetrahydrofuran (0.609 ml, 0.609 mmol) was added to azidotrimethylsilane (0.34 ml, 2.6 mmol) in tetrahydrofuran (3.5 ml), and the mixture was kept at room temperature for 0.5 h. The resulting solution was added to BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one, and the mixture was agitated at room temperature for 4-5 h. The acyl azide resin was filtered, washed with dichloromethane and acetone. IR (cm<sup>-1</sup>): 2136 (N<sub>3</sub>). The resin was further analyzed by cleavage with 60% trifluoroacetic acid in dichloromethane (2 ml per 0.100 g, 0.029 mmol of the resin, 2 h). The resulting supernatant was evaporated under vacuum to give the released acyl azide product. R<sub>f</sub> 3.3 min. IR (cm<sup>-1</sup>): 2138 (N<sub>3</sub>). MS (m/z): 278.1 [M-N<sub>2</sub>+H]<sup>+</sup>. <sup>1</sup>H NMR.

Method B: with tetrabutylammonium azide. BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (Tentagel HL NH<sub>2</sub> resin, 1.00 g, ca. 0.40 mmol/g) was agitated with tetrabutylammonium azide (0.797 g, 2.8 mmol) in tetrahydrofuran (10 ml) for 5 h at room temperature. The resin was filtered, washed liberally with dichloromethane and acetone, and dried under vacuum.

BAL Resin Immobilized Protected Amine 5-(S)-Acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized acyl azide 5-(S)-acetamidomethyl-3-[4'-azidocarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.75 g, 0.22 mmol) and (9-fluorenyl)methanol (1.18 g, 6.0 mmol) in tetrahydrofuran (7.0 ml) were agitated at 80 °C for 4 h. The resulting Fmoc-protected amine resin was washed with tetrahydrofuran, MeOH, dichloromethane, and dried under vacuum.

5-(S)-Acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluoro-phenyl]-oxazolidine-2-one

Method A. BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (0.200 g) was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h. The



resulting supernatant was evaporated under vacuum to give the released Fmoc carbamate product.  $R_f$  4.3 min. MS (m/z): 490.2 [M + H]<sup>+</sup>. <sup>1</sup>H NMR.

Method B. 9-Fluorenylmethyl chloroformate (0.039 g, 0.15 mmol) in dichloromethane (0.300 ml) and pyridine (0.05 ml, 0.62 mmol) was added to BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-amino-3'-fluorophenyl]oxazolidine-2-one, and the mixture was agitated at room temperature for 2 h. The resulting resin was worked up and cleaved as described above for Method A.  $R_f$  4.3 min. MS (m/z): 490.2 [M + H]<sup>+</sup>. <sup>1</sup>H NMR.

BAL Resin Immobilized Amine 5-(S)-Acetamidomethyl-3-[4'-amino-3'-fluorophenyl]-oxazolidine-2-one

Method A. BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (ca. 0.200 g) was deprotected with 20% piperidine in dimethylformamide (2 ml) for 20 min. The resulting amine resin was washed liberally with MeOH, dichloromethane, and dried under vacuum. The resin was analyzed by cleavage with 60% trifluoroacetic acid in dichloromethane (2 ml, 2 h). The resulting supernatant was evaporated under vacuum to give the released amine product. MS (m/z): 268.1 [M + H]<sup>+</sup>. <sup>1</sup>H NMR.

Method B. BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)-oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.200 mg), azidotrimethylsilane (0.240 ml, 1.74 mmol) and catalytic tetrabutylammonium fluoride (0.05 ml, 0.05 mmol) in tetrahydrofuran (5 ml) were agitated at 80 °C for 4 h. The resulting amine resin was washed liberally with MeOH and dichloromethane. It was dried under vacuum and analyzed as described above for Method A. MS (m/z): 268.1 [M + H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(para-nitrobenzene)sulfonamido-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-amino-3'-fluorophenyl]-oxazolidine-2-one (0.200 g) was agitated with para-nitrobenzenesulfonyl chloride (0.108 g, 0.50 mmol) in dichloromethane (2.0 ml) with N-methylmorpholine (0.200 ml) for 14 h at room temperature. The resulting sulfonamide resin was filtered, washed liberally with dimethylformamide, MeOH,

dichloromethane, and dried under vacuum. The dry resin was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml, 2 h). The resulting supernatant was evaporated under vacuum to give the sulfonamide product. MS (m/z): 453.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5                    N<sup>1</sup>-(9-Fluorenylmethoxycarbonyl)-N<sup>2</sup>-[4'-(5''-(S)-acetamidomethyloxazolidine-2-one-3''-yl)-3'-fluorophenyl]thiourea

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-amino-3'-fluorophenyl]-oxazolidine-2-one (0.200 g) was agitated with 9-fluorenylmethoxycarbonylisocyanate (0.140 g, 0.50 mmol) in dichloromethane (2.0 ml) for 14 h at room temperature. The resulting thiourea resin was filtered, washed liberally with dimethylformamide, MeOH, dichloromethane, and dried under vacuum. The dry resin was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml, 2 h). The resulting supernatant was evaporated under vacuum to give the sulfonamide product. R<sub>t</sub> 4.5 min. MS (m/z): 549.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

15                    5-(S)-Acetamidomethyl-3-[4'-(4''-phenylthiazole-2''-yl)amino-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized N<sup>1</sup>-(9-Fluorenylmethoxycarbonyl)-N<sup>2</sup>-[4'-(5''-(S)-acetamidomethyloxazolidine-2-one-3''-yl)-3'-fluorophenyl]thiourea was deprotected with 20% piperidine in dimethylformamide (2 ml) for 40 min, filtered, washed liberally with MeOH, dichloromethane, and dried under vacuum. 2-Bromoacetophenone (0.100 g, 0.50 mmol) in tetrahydrofuran (2.0 ml) was added, and the mixture was agitated at room temperature for 2 h. The resulting thiazole resin was washed liberally with MeOH, dichloromethane, and dried under vacuum. The dry resin was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml, 2 h). The resulting supernatant was evaporated under vacuum to give the thiazole product. R<sub>t</sub> 3.9 min. MS (m/z): 427.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

25                    5-(S)-Acetamidomethyl-3-[4'-(5''-amino-4''-cyanooxazole-2''-yl)-3'-fluorophenyl]oxazolidine-2-one

30                    BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)-oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.100 g) was agitated with

aminomalonnitrile tosylate (0.253 g, 1 mmol) in a mixture of dry pyridine and N-methylpyrrolidine-2-one (1:1, 2.0 ml) at 60 °C for 8-10 h. The resulting aminooxazole resin was washed liberally with MeOH, dichloromethane, and dried under vacuum. The dry resin was cleaved with 60% trifluoroacetic acid in dichloromethane (2 ml, 2 h). The resulting supernatant was evaporated under vacuum to give the oxazole product.  $R_f$  3.2 min. MS (m/z): 360.1 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one

Triphenylphosphine (2.82 g, 10.8 mmol) was added portionwise to a solution of 5-(S)-azidomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]-oxazolidine-2-one (5.00 g, 9.79 mmol) in THF (40 mL), and the mixture stirred for 2 h at room temperature. Water (1.41 mL, 78.3 mmol) was added, and the mixture heated at 40 °C overnight. Solvent was removed under vacuum, and the oily residue dissolved in dichloromethane (50 mL). Acetic anhydride (4.62 ml, 49.0 mmol) and pyridine (7.92 ml, 97.9 mmol) were added, and the mixture stirred for 8 h at r.t. Solvent was removed under vacuum and the crude product purified by silica gel flash column chromatography (eluent: 30% ethyl acetate in hexanes) to give the product as a foam (4.98 g, 97 %); MS: 527 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

BAL Resin Immobilized 5-(S)-Aminomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]-oxazolidine-2-one

Diisopropylcarbodiimide (4.24 ml, 27.0 mmol) was added to 4-(4-formyl-3,5-dimethoxyphenoxy)butyric acid (13.19 g, 49.2 mmol) and pyridine (20 mL) in dichloromethane (190 mL), and the mixture was stirred at room temperature for 1 h. Tentagel S-NH<sub>2</sub> resin (Rapp Polymere, 30.0 g, 12.3 mmol) was added, and the mixture agitated at room temperature overnight. Resulted BAL resin was filtered, washed liberally with methanol and dichloromethane and dried under vacuum. Triphenylphosphine (7.97 g, 0.0304 mol) was added to a mixture of above BAL aldehyde resin (50.9 g, 0.0209 mol) and 5-(S)-azidomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one (15.5g, 30.4 mmol) in THF (200 ml) under nitrogen at r.t. (room temperature). The

mixture was agitated at r.t. for 2 h and then heated at 75 °C for 16 h. The mixture was cooled to r.t., and 1M sodium cyanoborohydride in THF (62.7 ml, 62.7 mmol) was added. The mixture was agitated for 8 h at r.t. The resin was filtered, washed liberally with methanol and dichloromethane and dried under vacuum.

5        BAL Resin Immobilized 5-(S)-Acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized 5-(S)-Aminomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]-oxazolidine-2-one (5.00 g, 2.05 mmol) was suspended in 5% trifluoroacetic acid and 2.5% triisopropylsilane in dichloromethane (50 mL), and the mixture was agitated for 1 h. The resin was filtered and the procedure repeated with fresh 5% trifluoroacetic acid and 2.5% triisopropylsilane in dichloromethane (50 mL) for another 30 minutes. The resin was filtered and washed liberally with dichloromethane. Resulted thiol resin was immediately suspended in a mixture of acetic anhydride (20 mL) and pyridine (30 mL) in DCM (50 mL), and the mixture was agitated overnight at r.t. The resin was filtered, washed liberally with dichloromethane and dried under vacuum.

15        5-(S)-Acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one. (0.15 g, 0.041 mmol) was suspended in 60% trifluoroacetic acid in dichloromethane for 2 at r.t. Supernatant was evaporated under vacuum and the crude product was purified by TLC (10% methanol in dichloromethane). Yield 8.7 mg (67 %). MS: 327 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

20        Ester Oxazolidinone Derivatives

25        General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones

Method A. 4.37 M Sodium methoxide in methanol (0.0927 ml, 0.405 mmol) was added to an appropriate BAL resin immobilized 5-(S)-amidomethyl-3-[4'-acylthio-3'-fluorophenyl]oxazolidine-2-one (prepared as described above; 0.15 g, 0.041 mmol) in a polar aprotic solvent (preferably, N-methylpyrrolidine-2-one, 1.5 mL), and the mixture was agitated for 5-25 min (typically completed within 5 min for acetylated compounds). Optionally, an organic base was used

instead of sodium methoxide (e.g., tetramethylguanidine or alkylamine). An appropriate alkylating or (hetero)arylate reagent (0.8-1.6 mmol) was added, and the mixture agitated at r.t. for 12-36 h (typically, complete overnight). The resin wash washed thoroughly with N-methylpyrrolidine-2-one, dichloromethane, and methanol. The resin was suspended in 60% trifluoroacetic acid in dichloromethane and agitated at room temperature for 2 h. Supernatant was evaporated under vacuum and the crude product purified by TLC (methanol-dichloromethane mixtures).

Method B. 5% Trifluoroacetic acid and 2.5% triisopropylsilane in dichloromethane (2.0 mL) was added to 5-(S)-acetamidomethyl-3-[4'-triphenylmethylthio-3'-fluorophenyl]oxazolidine-2-one (0.10, 0.19 mmol), and the mixture was stirred at r.t. for 1 h. and the mixture stirred for 1 h at room temperature. Solvent was removed under vacuum, and the residue dissolved in methanol (3 mL). An appropriate alkylating or (hetero)arylate reagent (19-0.38 mmol) was added, followed by dropwise addition of 4.37 M sodium methoxide in methanol (0.087 ml, 0.380 mmol). Optionally, an organic base was used instead of sodium methoxide (e.g., tetramethylguanidine or alkylamine). The mixture was stirred at 20-70 °C for 2-24 h (typically, 2 h at r.t.). Solvent was removed under vacuum and the crude product purified by TLC (methanol-dichloromethane mixtures).

5-(S)-Acetamidomethyl-3-[4'-(6"-chloropyridazine-3"-yl)thio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one with 3,6-dichloropyridazine (0.12 g, 0.81 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. overnight, and the crude cleaved product purified by TLC (eluent: 10% methanol in dichloromethane). Yield 3.9 mg (24%). MS: 397 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(4'',6''-dimethoxy-1'',3'',5''-triazine-2''-yl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-

5 fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one with 2-chloro-4,6-dimethoxy-1,3,5-triazine (0.1 g, 0.81 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. overnight, and the crude cleaved product purified by TLC (eluent: 10% methanol in dichloromethane). Yield 6.1 mg (36%). MS: 424 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(5''-nitropyridine-2''-yl)thio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-

15 fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one with 2-chloro-5-nitropyridine (0.13 g, 0.81 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. overnight, and the crude cleaved product purified by TLC (eluent: 10% methanol in dichloromethane). Yield 7.0 mg (44%). MS: 407 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-(4'-[2''-(4'''-morpholino)ethyl]thio-3'-fluorophenyl)-oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-

25 fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-acetylthio-3'-fluorophenyl]oxazolidine-2-one with 4-(2-chloroethyl)morpholine hydrochloride (0.28 g, 0.81 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. overnight, and the crude cleaved product purified by TLC (eluent: 10% methanol in dichloromethane). Yield 2.4 mg (15%). MS: 398 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.



5-(S)-Acetamidomethyl-3-[4'-(1'',2'',4''-oxadiazole-3''-yl)methylthio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]-oxazolidine-2-one with 3-chloromethyl-1,2,4-oxadiazole (0.045 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.043 g (62%). MS: 367 [M+H]<sup>+</sup>.

10 5-(S)-Acetamidomethyl-3-[4'-(methoxycarbonyl)methylthio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with methyl bromoacetate (0.058 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.056 g (83%). M.p. 119-120 °C. MS: 357 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

20 5-(S)-Acetamidomethyl-3-[4'-(2''-methoxyethyl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 2-chloroethyl methyl ether (0.036 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.034 g (52%). MS (m/z): 343 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

30 5-(S)-Acetamidomethyl-3-[4'-(3''-nitrothien-2''-yl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 3-nitrothiophene-2-thiol (0.036 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.034 g (52%). MS (m/z): 359 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.



dine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 2-chloro-3-nitrothiophene (0.062 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.066 g (85%). M.p. 194-195 °C. MS (m/z): 412 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(acetylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with chloroacetone (0.062 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.039 g (61%). MS (m/z): 341 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-hydroxyethyl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 2-bromoethanol (0.048 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.045 g (72%). MS (m/z): 329 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(5''-carboxypyridine-3''-yl)thio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with t-butyl 2-chloronicotinate (0.081 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The intermediate t-butyl ester of the product was deprotected with 20%

trifluoroacetic acid in dichloromethane (1 mL, 2 h at r.t.). Solvent was evaporated under vacuum, and the crude product washed with diethyl ether. Yield 0.050 g (65%). MS (m/z): 406 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-(4'-cyclopropylmethylthio-3'-fluorophenyl)oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with chloromethyl cyclopropane (0.051 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.053 g (82%). MS (m/z): 339 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(3''-cyanoethyl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 3-bromopropionitrile (0.051 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.032 g (50%). MS (m/z): 338 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(5''-nitrothiazole-2''-yl)thio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with 2-bromo-5-nitrothiazole (0.079 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.061 g (78%). MS (m/z): 413 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(5''-phenyl-1'',2'',4''-oxadiazole-3''-yl)methylthio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-

5 fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamido-methyl-3-[4'-(triphenylmethyl)lthio-3'-fluorophenyl]oxazolidine-2-one with 3-chloromethyl-5-phenyl-1,2,4-oxadiazole (0.074 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.040 g (47%). MS (m/z): 443 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(3''-methoxycarbonylpropane-2''-one-1''-yl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamido-methyl-3-[4'-(triphenylmethyl)lthio-3'-fluorophenyl]oxazolidine-2-one with methyl 4-chloroacetoacetate (0.057 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.027 g (35%). MS (m/z): 399 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-chloroethyl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)lthio-3'-fluorophenyl]oxazolidine-2-one with 1-bromo-2-chloroethane (0.055 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.047 g (72%). MS (m/z): 347 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(1''-ethoxycarbonyl-1'',1''-dimethyl)methylthio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-

dine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with ethyl 2-bromoisobutyrate (0.074 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.061 g (80%). MS (m/z): 399 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-diethoxyphosphinoyl)ethylthio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with diethyl (2-bromoethyl)phosphonate (0.093 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.043 g (50%). MS (m/z): 449 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(thiocyano)methylthio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with chloromethyl thiocyanate (0.041 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.022 g (35%). MS (m/z): 324 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(3''-methyltetrahydrofuran-2''-one-3''-yl)thio-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(triphenylmethyl)thio-3'-fluorophenyl]oxazolidine-2-one with  $\alpha$ -bromo- $\alpha$ -methyl- $\gamma$ -butyrolactone (0.068 g, 0.38 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.035 g (48%). MS (m/z): 383 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-diethylamino)ethylthio-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(substituted)thio-3'-

5 fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamido- methyl-3-[4'-(triphenylmethyl)lthio-3'-fluorophenyl]oxazolidine-2-one with 2-(diethylamino)ethyl chloride hydrochloride (0.065 g, 0.38 mmol) and 4.37 M sodium methoxide (0.174 mL, 0.760 mmol) in N-methylpyrrolidine-2-one (1 mL). The synthesis was performed at r.t. for 2 h. The crude product was purified by  
10 TLC (eluent: 10% methanol in dichloromethane). Yield 0.011 g (15%). MS (m/z): 383 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-hydroxyethyl)sulfinyl-3'-fluorophenyl]oxazolidine-2-one

Sodium periodate (0.014 g, 0.065 mmol) in water (0.5 mL) was added to  
15 5-(S)-acetamidomethyl-3-[4'-(2''-hydroxyethyl)thio-3'-fluorophenyl]-oxazolidine-2-one (0.020 g, 0.061 mmol) in methanol (1 mL), and the mixture was stirred at r.t. overnight. Solvent was removed under vacuum, and the residue dissolved in ethyl acetate (ca. 5 mL). Resulting solution was washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the crude  
20 product purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.018 g (86%). MS (m/z): 345 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(2''-hydroxyethyl)sulfonyl-3'-fluorophenyl]-oxazolidine-2-one

30% Hydrogen peroxide (0.023 mL, 0.244 mmol) was added to 5-(S)-  
25 acetamidomethyl-3-[4'-(2''-hydroxyethyl)thio-3'-fluorophenyl]oxazolidine-2-one (0.020 g, 0.061 mmol) in acetic acid (1 mL), and the mixture was stirred at 60 °C overnight. Solvent was removed under vacuum, and the residue dissolved in ethyl acetate (ca. 5 mL). Resulting solution was washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the crude product  
30 purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.017 g (77%). M.p. 162-163 °C. MS (m/z): 361 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

## Ester Oxazolidinone Derivatives

### 5-(S)-(N-Acetylaminomethyl)-3-[4'-(*tert*-butoxy)carbonyl-3'-fluorophenyl]-oxazolidine-2-one.

Triphenylphosphine (0.521 g, 1.99 mmol) was added portionwise to a solution of 5-(S)-(N-azidomethyl)-3-[4'-(*tert*-butoxy)carbonyl-3'-fluorophenyl]oxazolidine-2-one (0.607 g, 1.80 mmol) in THF (10 ml), and the mixture was stirred at r.t. for 2 h. Water (0.259 ml, 14.4 mmol) was added, and the mixture heated at 40 °C overnight. Solvent was removed under vacuum. The oily residue was dissolved in a mixture of acetic anhydride (0.849 ml, 9.00 mmol) and pyridine (0.146 ml, 18.0 mmol) in dichloromethane (10 ml) and stirred for 4 h. Solvent was removed under vacuum, and the crude product was purified by TLC (eluent: 10 % methanol in dichloromethane). Yield 0.62 g (98 %). MS (m/z): 353 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

### 5-(S)-(N-Acetylaminomethyl)-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-one

5-(S)-(N-Acetylaminomethyl)-3-[4'-(4''-(*tert*-butoxy)carbonyl-3'-fluorophenyl]oxazolidine-2-one (6.20 g, 17.5 mmol) was dissolved in 20 % trifluoroacetic acid in dichloromethane, and the mixture stirred at r.t. overnight. Solvent was removed under vacuum, and the residue triturated with ether to give product as a white solid. Yield 5.20 g (99 %). M.p. 252-253 °C; MS: 297 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

### General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(alkyl[or (hetero)aryl]oxy)carbonyl-3'-fluorophenyl]-oxazolidine-2-ones

Method A. An appropriate 5-(S)-(N-acylaminomethyl)-3-[4'-(4''-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one resin of the type 5 (0.1 mmol; prepared from resin 4 *via* two step acylation with an appropriate N-acylating reagent, and subsequent Pfp-activation as described above) was mixed with a selected alcohol reagent (1-3 mmol, typically, 1-2 mmol) and 4-dimethylaminopyridine (0.2-1 mmol; typically, 1 mmol) in aprotic solvent (N,N-dimethylformamide, dichloromethane, or dimethylsulfoxide; preferably, N,N-dimethylformamide, 4-6 mL). The mixture was agitated at 20-70 °C for 6-48 h (typically, at r.t. overnight). The resin was filtered, washed liberally with N,N-

dimethylformamide, dichloromethane, methanol, dried *in vacuo*, and cleaved with 60% trifluoroacetic acid in dichloromethane (5 ml, 2 h). Resulting supernatant was evaporated *in vacuo*, and the crude product purified by HPLC or TLC.

5           Method B. An appropriate alkylating reagent (0.35-1.2 mmol; preferably, 1 mmol) was added to 5-(S)-(N-acetamidomethyl)-3-[4'-(pentafluorophenyl)oxy]carbonyl-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol) and potassium carbonate (0.187 g, 1.35 mmol) in N,N-dimethylformamide (2 mL), and the mixture agitated at 20-80 °C for 6-24 h (typically, at r.t. overnight). Water  
10 (ca. 10-15 mL) was added, and the mixture was extracted with ethyl acetate (ca. 3 x 20 mL). Combined organic solvents were washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent was evaporated *in vacuo*, and the crude product purified by HPLC or TLC.

15           5-(S)-(N-Acetylaminomethyl)-3-[4'-cyclopropylmethoxycarbonyl-3'-fluoro-phenyl]oxazolidine-2-one

          Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[alkyl[or (hetero)aryl]oxy]carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin 5-(S)-(N-acylaminomethyl)-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluoro-phenyl]oxazolidine-2-one (0.1  
20 mmol) and hydroxymethylcyclopropane (0.144 g, 2 mmol) with 4-dimethylaminopyridine (1 mmol) in N,N-dimethylformamide (4 mL). Reaction performed at r.t. overnight. Crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). MS (m/z): 350 [M+H]<sup>+</sup>. Alternatively, the compound was made according to Method B of aforementioned General  
25 Procedure from 5-(S)-(N-acetamidomethyl)-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-one (0.100 g, 0.34 mmol) and (bromomethyl)cyclopropane (0.098 mL, 1 mmol). Reaction was performed at 70 °C overnight. Crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.100 g (85%). MS (m/z): 350 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-methoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[alkyl[or (hetero)aryl]oxy]- carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-(N-acetamido-methyl)-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol) and methyl iodide (0.063 mL, 1 mmol). Reaction was performed at r.t. overnight. Crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 104 mg (99%). MS (m/z): 311 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-isopropoxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[alkyl[or (hetero)aryl]oxy]- carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-(N-acetamido-methyl)-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol) and 2-bromopropane (0.095 mL, 1 mmol). Reaction was performed at 70 °C overnight. Crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 105 mg (92%). MS (m/z): 339 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-ethoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[alkyl[or (hetero)aryl]oxy]- carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-(N-acetamido-methyl)-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol) and ethyl iodide (0.081 mL, 1 mmol). Reaction was performed at r.t. overnight. Crude product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 107 mg (98%). MS (m/z): 325 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-[(N-isopropylidene)imino]oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

A mixture of 5-(S)-(N-acetamidomethyl)-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol), 4-(dimethylamino)-pyridine (0.041 g, 0.34 mmol), diisopropylcarbodiimide (0.053 ml, 0.34 mmol)



and acetone oxime (0.025 g, 0.34 mmol) in N, N-dimethylformamide (2 ml) was stirred at r.t. overnight. The reaction mixture was diluted with water and extracted with ethyl acetate. Organic layers were washed with brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the residue was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.098 g (83 %). MS (m/z): 352 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-(pyridine-3''-yl)methoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one

A mixture of 5-(S)-(N-acetamidomethyl)-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.100 g, 0.34 mmol), 4-(dimethylamino)pyridine (0.041 g, 0.34 mmol), diisopropylcarbodiimide (0.053 ml, 0.34 mmol) and 3-pyridylcarbinol (0.033 g, 0.34 mmol) in N, N-dimethylformamide (2 ml) was stirred at r.t. overnight. The reaction mixture was diluted with water and extracted with ethyl acetate. Organic layers were washed with brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum, and the residue was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.094 g (72 %). MS (m/z): 388 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

Amide Oxazolidinone Derivatives

General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[(un)substituted amino]carbonyl-3'-fluorophenyl]-oxazolidine-2-ones 7

Method A. An appropriate 5-(S)-(N-acylaminomethyl)-3-[4'-(4''-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one resin of the type 5 (prepared from BAL resin immobilized 5-(S)-aminomethyl-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-one 4 *via* two step acylation with an appropriate N-acylating reagent, and subsequent Pfp-activation as described above (0.029 mmol) was agitated with a selected amine compound (0.1-0.2 mmol; preferably 0.116 mmol) in a polar non-protic solvent such as N-methylpyrrolidine-2-one, N,N-dimethylformamide (2-4 ml) for 16-48 h at 25-70 °C (preferably, at 60 °C overnight) containing 10-20% v/v of an organic base (pyridine, 2,6-lutidine, or diisopropylethylamine). Optionally, dimethylsulfoxide (0.5-1 mL) was added for less soluble amine reagents. Also optionally, functionalized amines (such as amino acids or amino alcohols) were pre-dissolved with addition of a silylating

reagent (such as bis-trimethylsilylacetamide, 0.2-0.6 mmol) prior to addition to the resin, and the reaction was performed under inert gas atmosphere (nitrogen). Resulted resin was filtered and washed liberally with N-methylpyrrolidine-2-one, MeOH, dichloromethane, and dried under vacuum. The dry resin was cleaved in 60% trifluoroacetic acid in dichloromethane (2 ml) for 2 h at room temperature. The resin was filtered, the filtrate evaporated under vacuum, and crude product purified by preparative TLC (MeOH - dichloromethane) or reverse phase HPLC.

Method B. 60% Trifluoroacetic acid in dichloromethane (5 mL) was added to 5-(S)-azidomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.336 g, 1 mmol), and the solution kept at r.t. for 1 h. Solvents were removed *in vacuo* to afford 5-(S)-azidomethyl-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-one dried (0.280 g, 99%). N-Trimethylsilyl-N,N-diethylamine (0.23 mL, 1.2 mmol) was added to above product in dry dichloromethane (3 mL) under nitrogen atmosphere, and the solution stirred for 15 min. Solvents and excess reagent were removed *in vacuo*, and residue dissolved in dichloromethane (4 mL). The solution was cooled to ca. 0 °C, and oxalyl chloride (1.5 mmol, 0.13 mL) was added dropwise, followed by catalytic N,N-dimethylformamide (ca. 0.01 mL). The mixture was allowed to warm up to r.t., and stirred at r.t. for another 2 h. Solvents were removed *in vacuo*, and the resulting 5-(S)-azidomethyl-3-[4'-chlorocarbonyl-3'-fluorophenyl]-oxazolidine-2-one redissolved in dry aprotic solvent (preferably, tetrahydrofuran, pyridine, or acetonitrile, 3-10 mL). Resulted solution (0.8 mL, ca. 0.2 mmol) was added to an appropriate amine reagent (1 mmol) in aprotic solvent (preferably, acetonitrile, or pyridine, 1-5 mL) optionally containing an organic base (preferably, pyridine, 0.5-2 mL). The mixture was stirred at r.t. for 1-5 h. Solvent was removed *in vacuo*, and resulting 5-(S)-azidomethyl-3-[4'-(substituted)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one was typically washed with water, and dried *in vacuo*. Triphenylphosphine (0.262 g, 1.0 mmol) in tetrahydrofuran (10 mL) was added to above azide intermediate, and the mixture stirred at 45-55 °C for 2 h. Water (0.5 mL) was added, and the mixture stirred overnight at 50-60 °C. Solvents were removed *in vacuo*, and resulting crude amine intermediates typically washed with excess diethyl ether. Aprotic solvent was added

(preferably, tetrahydrofuran, 5-15 mL) was added, followed by pyridine (0.25-0.5 mL) and acetic anhydride (0.2-0.5 mL), and the mixture stirred at r.t. for 0.5-2 h (typically, 1 h). Solvents were removed *in vacuo*, and resulting product typically washed with excess diethyl ether and dried *in vacuo*.

5           Method C. N,N-Diisopropyl-N-ethylamine (0.34 mL, 2 mmol) was added to 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one (0.296 g, 1 mmol) and a coupling reagents, [preferably, O-(7-azabenzotriazole-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate (HATU)] in a polar aprotic solvent such as N,N-dimethylformamide (3 mL) and tetrahydrofuran (2  
10       mL), and the solution was kept at r.t. for 20 min. An appropriate amine (1 mmol) was added, followed by an organic base (preferably, N,N-diisopropyl-N-ethylamine, 0.17 mL, 1 mmol), and the mixture stirred at 20-60 °C for 1-24 h (typically, at r.t. for 1-2 h). Additional base (typically, 1 mmol) was added when amine salts were employed. Optionally, catalytic 4-dimethylaminopyridine (0.05-  
15       0.2 mmol) was added for acylation of less reactive amines. Volatile organic solvents were removed *in vacuo*. The product was typically isolated by precipitation with excess of water (5-60 mL), or by extraction from aqueous solutions with ethyl acetate (20-40 mL). In the latter case, organic layers were washed with saturated aqueous sodium bicarbonate, water, 3% aqueous citric acid,  
20       water, brine, and dried (MgSO<sub>4</sub>). Organic solvent was removed *in vacuo*, and the product further purified by washing with excess of diethyl ether, or by crystallization from an appropriate solvent (typically, methanol or ethanol).

          Method D. N-Ethyl-N'-(3-diethylaminopropyl)carbodiimide (0.92 g, 4.8 mmol) was added to 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]  
25       ]oxazolidine-2-one (1.18 g, 4.0 mmol) and pentafluorophenol (0.81 g, 4.4 mmol) in N,N-dimethylformamide (50 mL) and the solution stirred at r.t. for 24 h. Most of solvent was removed *in vacuo*, the residue dissolved in acetonitrile (ca. 40 mL), and this solution added dropwise with stirring into 3% aqueous citric acid (ca. 150 mL). Precipitated 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-  
30       3'-fluorophenyl]oxazolidine-2-one was filtered off, washed with water, and dried *in vacuo* (yield 1.30 g, 70%; M.p. 172-173 °C; Rt 5.2 min). The resulting ester (1 mmol) was dissolved in a polar solvent (preferably, tetrahydrofuran or acetonitrile

10 mL), and an appropriate amine (1-5 mmol) added. The mixture was stirred at r.t. for 1-10 h (typically, 1-2 h). Solvent and excess reagent were removed *in vacuo*, and the product purified by chromatography or crystallization from an appropriate solvent.

5                    5-(S)-Acetamidomethyl-3-[4'-(6''-chloropyridine-3''-yl)aminocarbonyl-3'-fluorophenyl]oxazolidine-2-one

Method A. Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized  
10 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one and 2-chloro-5-amino-pyridine in 10% pyridine in N-methylpyrrolidine-2-one (70 °C, 48 h). MS: 407 [M+H]<sup>+</sup>. To obtain the hydrochloride form of this compound, above material (41 mg, ca. 0.1 mmol) was dissolved in methanol (10 mL) with 2M HCl in 1,4-dioxane (5 mL). Resulted  
15 solution was filtered, solvents removed *in vacuo*, and the crude salt washed with excess of diethyl ether.

Method B. Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluoro-phenyl]-oxazolidine-2-ones by amide coupling of 5-(S)-  
20 azidomethyl-3-[4'-chlorocarbonyl-3'-fluorophenyl]oxazolidine-2-one and 2-chloro-5-aminopyridine in pyridine (3 mL, r.t., 1 h). Solvent was removed *in vacuo*, and resulting 5-(S)-azidomethyl-3-[4'-(6''-chloropyridine-3''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one was washed with water (5 x 3 mL mL), and dried *in vacuo*. Triphenylphosphine (0.262 g, 1.0 mmol) in  
25 tetrahydrofuran (10 mL) was added to above azide intermediate, and the mixture stirred at 45 °C for 2 h. Water (0.5 mL) was added, and the mixture stirred overnight at 50 °C. Solvents were removed *in vacuo*, and resulting crude amine intermediate washed with excess diethyl ether. Tetrahydrofuran (15 mL) was added, followed by pyridine (0.25 mL) and acetic anhydride (0.2 mL), and the  
30 mixture stirred at r.t. for 1 h. Solvents were removed *in vacuo*, and resulting product washed with excess diethyl ether. MS: 407 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(thiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Method A. Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one and 2-aminothiazole in 10% pyridine in N-methylpyrrolidine-2-one (r.t., 24 h). MS: 379 [M+H]<sup>+</sup>. Rt 3.8 min. To obtain the hydrochloride form of this compound, above material (38 mg, ca. 0.1 mmol) was dissolved in methanol (10 mL) with 2M HCl in 1,4-dioxane (5 mL), filtered, solvents removed *in vacuo*, and the residue washed with excess of diethyl ether.

Method B. Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 2-aminothiazole (0.10 g, 1 mmol). The synthesis was performed at r.t. overnight. Tetrahydrofuran was removed *in vacuo*, and the residue added to water (60 mL). Resulted suspension was kept at r.t. for 1 h, filtered, and the product washed with excess water and dried *in vacuo*.

5-(S)-Acetamidomethyl-3-[4'-(4,5-dimethylthiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Method A. Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one and 2-amino-4,5-dimethylthiazole in 10% pyridine in N-methylpyrrolidine-2-one (r.t., 24 h). MS: 407 [M+H]<sup>+</sup>. Rt 4.1 min. <sup>1</sup>H NMR.

Method B. Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 2-amino-4,5-dimethyl-thiazole.

The synthesis was performed at r.t. for 3 h. MS: 407 [M+H]<sup>+</sup>. Rt 4.1 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(pyrimidine-4''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

5 Method A. Prepared according to Method A of the the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one and 4-aminopyrimidine in 10% pyridine in N-methylpyrrolidine-2-one (70 °C, 48 h). MS: 374 [M+H]<sup>+</sup>. Rt 3.4 min. <sup>1</sup>H NMR.

10 Method B. Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 4-aminopyrimidine. The  
15 synthesis was performed at r.t. for 24 h. Water (15 mL) was, and the mixture kept at r.t. for 3 days to allow for product crystallization. MS: 374 [M+H]<sup>+</sup>. Rt 3.4 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(thiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

20 Method A. Prepared according to the General Procedure for preparation of 5-(S)-(N-acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one and 5-chloro-2-aminothiazole in 10% pyridine in N-methylpyrrolidine-2-one (70 °C, 48  
25 h). MS: 413 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

30 Method B. Prepared according to Method B of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones by amide coupling of 5-(S)-azidomethyl-3-[4'-chlorocarbonyl-3'-fluorophenyl]oxazolidine-2-one and 5-chloro-2-aminothiazole hydrochloride in tetrahydrofuran (ca. 4 mL) and acetonitrile (2.5 mL) with pyridine (0.5 mL). The mixture was stirred for 2 h at r.t., and methanol (ca. 7 mL) was added. Resulted precipitate of 5-(S)-

azidomethyl-3-[4'-(thiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidi-ne-2-one was filtered, washed with methanol (8 mL), diethyl ether, and dried *in vacuo*. Triphenylphosphine (0.31 g, 1.2 mmol) in N-methylpyrrolidine-2-one (1.25 mL) and tetrahydrofuran (1.25 mL) was added to above azide intermediate, and the mixture stirred at r.t. for 2 h. Water (0.1 mL) was added, and the mixture stirred overnight at 50 °C. Solvents were removed *in vacuo*, and resulting crude amine intermediate washed with excess diethyl ether. Tetrahydrofuran (8 mL) was added, followed by pyridine (0.5 mL) and acetic anhydride (0.5 mL), and the mixture stirred at r.t. for 30 min. Solvents were removed *in vacuo*, and resulting product washed with excess diethyl ether, water (2 x 3 mL), diethyl ether, and dried *in vacuo*. MS: 413 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(Methylthio)acetamidomethyl-3-[4'-(6''-chloropyridine-3''-yl)amino-carbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophen-yl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-(methylthio)acetamidomethyl-3-[4'-(pentafluorophenyl)-oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one and 2-chloro-5-aminopyridine. MS: 453 [M+H]<sup>+</sup>. To obtain the hydrochloride form of this compound, above material (45 mg, ca. 0.1 mmol) was dissolved in methanol (10 mL) with 2M HCl in 1,4-dioxane (5 mL), filtered, solvents removed *in vacuo*, and the residue washed with excess of diethyl ether.

5-(S)-Acetamidomethyl-3-[4'-(benzothiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 2-aminobenzothiazole. The synthesis was performed at r.t. over 3 h. MS: 429 [M+H]<sup>+</sup>. Rt 4.6 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(6''-methoxybenzothiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 6-methoxy-2-aminobenzothiazole. The synthesis was performed at r.t. over 3 h. MS: 459 [M+H]<sup>+</sup>. Rt 4.7 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(6''-methoxybenzothiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)-carbonyl-3'-fluorophenyl]-oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 5-methylthio-3-aminopyridine. The synthesis was performed at r.t. overnight. MS: 419 [M+H]<sup>+</sup>. Rt 3.8 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(4''-amino-5''-phenylthiazole-2''-yl)aminocarbo-nyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophen-yl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 2,4-diamino-5-phenylthiazole hydrobromide. The synthesis was performed at r.t. overnight. MS: 470 [M+H]<sup>+</sup>. Rt 4.5 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(5''-ethylthio-1,3,4-thiadiazole-2''-yl)aminocarbo-nyl-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophen-yl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 5-ethylthio-2-amino-1,3,4-thiadiazole. MS: 440 [M+H]<sup>+</sup>. R<sub>t</sub> 4.4 min. <sup>1</sup>H NMR.



5-(S)-Acetamidomethyl-3-[4'-(1,3,4-thiadiazole-2''-yl)aminocarbonyl-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method C of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophen-yl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one and 2-amino-1,3,4-thiadiazole. MS: 380 [M+H]<sup>+</sup>. R<sub>t</sub> 3.6 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(imidazole-2''-yl)aminocarbonyl-3'-fluorophen-yl]oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-(methylthio)acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.400 g, ca. 0.1 mmol) and 2-aminoimidazole sulfate (0.234 g, 2 mmol). The amine reagent was pre-dissolved in a mixture of 10% pyridine in N-methylpyrrolidine-2-one (4 mL), bis-(trimethylsilyl)acetamide (0.5 mL), and 1,8-diazabicyclo[5.4.0]undec-7-ene (0.15 mL, 1 mmol) at 70 °C over 2 h. Coupling with the resin reagent was performed at r.t. over 48 h. The crude product after cleavage from resin was purified by reverse-phase HPLC. MS: 362 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(1,3,4-triazole-2''-yl)aminocarbonyl-3'-fluorophen-yl]oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-(methylthio)acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.400 g, ca. 0.1 mmol) and 2-amino-1,3,4-triazole (0.168 g, 2 mmol). The amine reagent was pre-dissolved in a mixture of 10% pyridine in N-methylpyrrolidine-2-one (4 mL), bis-(trimethylsilyl)acetamide (0.5 mL) at 70 °C over 2 h. Coupling with the resin reagent was performed at 60 °C over 48 h. The crude product after cleavage from resin was purified by reverse phase HPLC. MS: 363 [M+H]<sup>+</sup>. R<sub>t</sub> 3.1 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(pyridine-3''-yl-1''-oxide)aminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

30% Aqueous hydrogen peroxide (0.05 mL) was added to 5-(S)-acetamidomethyl-3-[4'-(3''-pyridylamino)carbonyl-3'-fluorophenyl]-oxazolidine-2-one (7 mg, ca. 0.02 mmol) and methylrhodium trioxide (MTO, 0.9 mg) in N-methylpyrrolidine-2-one (0.15 mL). The mixture was stirred for 30 min at r.t., and solvents removed *in vacuo* (0.1 Torr, r.t.). The crude product was washed with methanol (0.5 mL) and diethyl ether. MS: 389 [M+H]<sup>+</sup>. R<sub>f</sub> 3.3 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-hydroxyaminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method D of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one (0.046 g, 0.1 mmol) and O-trimethylsilylhydroxylamine (0.052 mL, ca. 0.5 mmol) in tetrahydrofuran (1 mL). The synthesis was performed for 2 h at r.t. Diethyl ether (4 mL) was added, the precipitated product washed with diethyl ether, tetrahydrofuran (2 x 0.5 mL), excess ether, and dried *in vacuo*. MS: 312 [M+H]<sup>+</sup>. R<sub>f</sub> 2.8 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-methylaminocarbonyl-3'-fluorophenyl]-oxazolidine-2-one

Prepared according to Method D of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acetamidomethyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one (0.046 g, 0.1 mmol) and 2 M methylamine in tetrahydrofuran (1 mL, 2 mmol). The synthesis was performed at r.t. for 45 min. Diethyl ether (4 mL) was added, the precipitated product washed with diethyl ether, tetrahydrofuran (2 x 0.5 mL), excess ether, and dried *in vacuo*. MS: 310 [M+H]<sup>+</sup>. R<sub>f</sub> 3.2 min. <sup>1</sup>H NMR.

5-(S)-*trans*--[4''-Methoxyimino)cinnamoyl)methyl-3-[4'-aminocarbonyl-3'-fluorophenyl]oxazolidine-2-one

Prepared according to Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-(4''-(un)substituted amino)carbonyl-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-[*trans*--(4''-methoxyimino)cinnamoyl)methyl-3-[4'-(pentafluorophenyl)oxycarbonyl-3'-fluorophenyl]oxazolidine-2-one (0.400 g, ca. 0.1 mmol) and 2 M ammonia in 1,4-dioxane (5 mL, ca. 10 mmol). The synthesis was performed at r.t. overnight. The crude product after cleavage from resin was purified by reverse phase HPLC.

MS: 441 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

General Procedure for Preparation of 5-(S)-Amidomethyl-3-[4'-[(un)substituted 1'',3'',5''-triazine-2''-yl]amino-3'-fluorophenyl]oxazolidine-2-one

An appropriate BAL resin immobilized 5-(S)-acylaminomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (0.06-0.1 mmol) was deprotected by agitation with 20% piperidine in DMF (4 mL) for 45 min. Resulted aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. A solution of an appropriate halogen-substituted triazine reagent (preferably, a chlorotriazine derivative, 1-3 mmol) and organic base (preferably N,N-diisopropyl-N-ethylamine or 2,6-di-*t*-butylpyridine, 3-6 mmol) in aprotic solvent (preferably, N-methylpyrrolidine-2-one, dichloromethane, 1,4-dioxane, or acetonitrile) was added, and the mixture agitated at 0-80 °C for 12-36 h (typically, at 0-40 °C overnight). Resulted aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. When the triazine oxazolidinone contained more than one halogen substituent, the reaction was optionally repeated using amine, thiol, or alcohol reagents as described above (40-80°C, 12-36 h). Washed and dry resin was cleaved with 60% trifluoroacetic acid in dichloromethane (5 ml, 2 h). Resulted supernatant was evaporated *in vacuo*, and the crude product purified by HPLC or TLC.

5-(S)-Acetamidomethyl-3-[4'-(4''-chloro-6''-1'',2'',3''-triazine-2''-yl)amino-3'-fluorophenyl]oxazolidine-2-one

BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophen-yl]oxazolidine-2-one (0.06 mmol) was deprotected by agitation with 20% piperidine in DMF (4 mL) for 45 min. Resulted aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. A solution of cyanuric trichloride (0.194 g, 1.0 mmol) and 2,6-di-t-butylpyridine (0.36 mL, 1.5 mmol) in dichloromethane (4 mL) was added, and the mixture agitated at r.t. for 24 h. Resulted aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. 0.5 M Ammonia in 1,4-dioxane (5 mL, 2.5 mmol) was added, and the mixture agitated at r.t. for 24 h. The resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, dried *in vacuo*, and cleaved with 60% trifluoroacetic acid in dichloromethane (5 ml, 2 h). Resulting supernatant was evaporated *in vacuo*, and the crude product purified by preparative TLC (eluent methanol - dichloromethane 1:10). MS: 396 [M+H]<sup>+</sup>. R<sub>f</sub> 3.6 min. <sup>1</sup>H NMR.

5-(S)-Acetamidomethyl-3-[4'-(4'',6''-dimethoxy-1'',3'',5''-triazine-2''-yl)amino-3'-fluoro-phenyl]oxazolidine-2-one

Prepared according to the General Procedure for Preparation of 5-(S)-Amidomethyl-3-[4'-[(un)substituted triazinyl]-3'-fluorophenyl]oxazolidine-2-one from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophe-nyl]oxazolidine-2-one (0.06 mmol) and 2-chloro-4,6-dimethoxytriazine (0.275 g, 1.5 mmol). Reaction of the immobilized aniline and the triazine reagent was repeated twice in a mixture of N-methylpyrrolidine-2-one and dichloromethane (1:1, 4 mL) at r.t. overnight. The crude cleaved product was purified by preparative TLC (eluent methanol - dichloromethane 1:10). MS: 407 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

## Acylamino Oxazolidinone Derivatives

### General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-acylamino-3'-fluorophenyl]oxazolidine-2-ones

An appropriate BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophen-yl]oxazolidine-2-one (0.1 mmol) was deprotected by agitation with 20% piperidine in DMF (4 mL) for 45 min. Resulting aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. Separately, N,N-diisopropyl-N-ethylamine (3-6 mmol; typically, 3 mmol) was added to selected carboxylic acid (1-2 mmol; typically, 1 mmol) and a coupling reagent [preferably, O-(7-azabenzotriazole-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate or diisopropylcarbodiimide; 3-6 mmol; typically, 3 mmol) in a polar aprotic solvent such as N,N-dimethylformamide (7-10 mL, and the mixture agitated at r.t. for 20-30 min. Resulted solution of the pre-activated acid reagent was added to above aniline resin, and the mixture agitated at 20-60 °C for 6-24 h (typically, at r.t. overnight). The resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, dried *in vacuo*, and cleaved with 60% trifluoroacetic acid in dichloromethane (5 ml, 2 h). Resulting supernatant was evaporated *in vacuo*, and the crude product purified by HPLC or TLC.

### 5-(S)-(N-Acetamidomethyl)-3-[4'-acetamido-3'-fluorophenyl]oxazolidine-2-ones

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-acylamino-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (0.1 mmol). The intermediate aniline was acylated with the mixture of acetic anhydride - pyridine - dichloromethane (1:1.5:3, 2 mL). Crude cleaved product was purified by TLC (eluent: 10 % methanol in dichloromethane). Yield 0.014 g (46 %). MS: 310 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-(2'',4''-thiazole-5''-yl)carbonylamino-3'-fluorophenyl]oxazolidine-2-ones

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-acylamino-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophen-yl]oxazolidine-2-one (0.1 mmol). Acylation was performed with 2,4-dimethylthiazole-5-carboxylic acid (0.157 g, 1 mmol) pre-activated with diisopropylcarbodiimide (0.086 mL, 0.55 mmol) and pyridine (0.081 mL, 1 mmol) in a mixture of N,N-dimethylformamide - dichloromethane 4:1 (2 mL) at r.t. overnight. Crude cleaved product was purified by TLC (eluent: 10 % methanol in dichloromethane). Yield 0.028 g (68 %). MS: 407 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acetamidomethyl)-3-[4'-(pyridine-3''-yl)carbonylamino-3'-fluoro- phenyl]oxazolidine-2-ones

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-acylamino-3'-fluorophenyl]oxazolidine-2-ones from BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophen-yl]oxazolidine-2-one (0.02 mmol). Acylation was performed with nicotinic acid (0.049 g, 0.40 mmol) pre-activated with O-(7-azabenzotriazole-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate (0.160 g, 0.20 mmol) and N,N-diisopropyl-N-ethylamine (0.21 mL, 1.20 mmol) in N,N-dimethylformamide (1 mL) at r.t. overnight. Crude cleaved product was purified by TLC (eluent: 10 % methanol in dichloromethane). Yield 0.023 g (62 %). MS: 373 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

Sulfonamido Oxazolidinone Derivatives

General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones

An appropriate BAL resin immobilized 5-(S)-acylaminomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (0.1 mmol) was deprotected by agitation with 20% piperidine in DMF (4 mL) for 45 min. Resulted aniline resin was washed liberally with N,N-dimethylformamide, dichloromethane, methanol, and dried *in vacuo*. The resin was suspended in 20%

pyridine in dichloromethane (2 mL), and a solution of selected sulfonyl chloride reagent (1-2 mmol; preferably, 1.25 mmol) in dichloromethane was added. The mixture was agitated at 20-40 °C for 12-36 h (typically, at r.t. overnight). Resin was filtered, washed with methanol, and suspended in 0.1M lithium hydroxide monohydrate in methanol (4 mL). The mixture was agitated at r.t. for 30-90 min (typically, for 90 min). The resin was filtered, washed liberally with N,N-dimethylformamide, dichloromethane, methanol, dried *in vacuo*, and cleaved with 60% trifluoroacetic acid in dichloromethane (5 ml, 2 h). Resulted supernatant was evaporated *in vacuo*, and the crude product purified by HPLC or TLC.

5-(S)-(N-Acylaminomethyl)-3-[4'-methylsulfonamido-3'-fluorophenyl]-oxazolidine-2-ones

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acylaminomethyl-3-[4'-(9"-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one (0.1 mmol) and methanesulfonyl chloride (0.2 mL, 1.25 mmol). The crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.022 g (65%). MS (m/z): 346 [M+H]<sup>+</sup>. <sup>1</sup>H NMR.

5-(S)-(N-Acylaminomethyl)-3-[4'-(benzo-2",1",3"thiadiazole-4"-yl)sulfon-amido-3'-fluorophenyl]oxazolidine-2-ones

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones from 5-(S)-acylaminomethyl-3-[4'-(9"-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl] oxazolidine-2-one (0.1 mmol) and benzo-2,1,3-thiadiazole-4-sulfonyl chloride (0.295 g, 1.25 mmol). The crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.024 g (52%). MS (m/z): 466 [M+H]<sup>+</sup>.

5-(S)-(N-Acetamidomethyl)-3-[4'-(4'',5'')-dibromothiophene-2'']-  
yl)sulfonamido-3'-fluorophenyl]oxazolidine-2-one.

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones from from BAL resin immobilized 5-(S)-acylaminomethyl-3-[4'-(9''-fluorenylmethoxycarbonyl)amino-3'-fluorophen-yl]oxazolidine-2-one (0.1 mmol) and 2,3-dibromothiophene-5-sulfonyl chloride (0.43 g, 1.25 mmol). The crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.044 g (77%). <sup>1</sup>H NMR. MS (m/z): 572 [M+H]<sup>+</sup>.

5-(S)-(N-Acetamidomethyl)-3-[4'-(6''-chloroimidazo[2,1-b]thiazole-5'']-  
yl)sulfonamido-3'-fluorophenyl]oxazolidine-2-one.

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones from from BAL resin immobilized 5-(S)-acylamino-methyl-3-[4'-(9''-fluorenylmethoxycarbonyl)-amino-3'-fluorophenyl]oxazolidi-ne-2-one (0.1 mmol) and 6-chloro-imidazo[2,1-b]thiazole-5-sulfonyl chloride (0.32 g, 1.25 mmol). The crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.019 g (39%). <sup>1</sup>H NMR. MS (m/z): 572 [M+H]<sup>+</sup>.

5-(S)-(N-Acetamidomethyl)-3-[4'-(2''-acetamido-4''-methylthiazole-5'']-  
yl)- sulfonamido-3'-fluorophenyl]oxazolidine-2-one.

Prepared according to the General Procedure for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones from from BAL resin immobilized 5-(S)-acylamino-methyl-3-[4'-(9''-fluorenylmethoxycarbonyl)-amino-3'-fluorophenyl]oxazolidine-2-one (0.1 mmol) and 2-acetamido-4-methyl-5-thiazolesulphonyl chloride (0.32 g, 1.25 mmol). The crude cleaved product was purified by TLC (eluent: 10% methanol in dichloromethane). Yield 0.025 g (52%). <sup>1</sup>H NMR. MS (m/z): 486 [M+H]<sup>+</sup>.



5-(S)-(N-Acetamidomethyl)-3-[4'-(N-methyl)methylsulfonamido-3'-fluorophenyl]-oxazolidine-2-one

BAL resin immobilized 5-(S)-(N-acetamidomethyl)-3-[4'-methylsulfonamido-3'-fluorophenyl]oxazolidine-2-one was prepared from from  
 5 BAL resin immobilized 5-(S)-acylaminomethyl-3-[4'-(9"-fluorenylmethoxycarbonyl)amino-3'-fluorophe-nyl]oxazolidine-2-one (0.1 mmol) and methanesulfonyl chloride (0.2 mL, 1.25 mmol) as described above in the synthesis of 5-(S)-(N-acetamidomethyl)-3-[4'-methylsulfonamido-3'-fluorophenyl]oxazolidine-2-one. N-Methylpyrrolidi-ne-2-one (2 ml) was added,  
 10 followed by methyl iodide (0.16 ml, 2.5 mmol) and 1,8-diazabicyclo[5.4.0]undec-7-ene (0.37 ml, 2.5 mmol). The mixture was agitated overnight at r.t. The resin was filtered, washed thoroughly with dichloromethane and methanol, and dried under vacuum. Orodut was cleaved with 60% trifluoroacetic acid in dichloromethane (5 mL, 2 h), solvent removed under vacuum, and the crude  
 15 product purified by TLC (eluent: 10 % methanol in dichloromethane). Yield 0.017 g (48 %). <sup>1</sup>H NMR. MS (m/z): 360 [M+H]<sup>+</sup>.

Procedures for Preparation of 3-(Heteroaryl)oxazolidine-2-one Derivatives.

5-(S)-Azidomethyloxazolidine-2-one

20 5-(R)-Chloromethyloxazolidine-2-one (prepared according to [Danielmeier et al. Efficient Pathways to (R)- and (S)-hydroxymethyl-2-oxazolidinone and some derivatives. Tetrahedron: Asymmetry. 1995, vol. 6, pp. 1181-1190] (5 mmol) is reacted with sodium azide (7-10 mmol) in acetone (ca. 40-50 mL) at r.t. for ca. 24 h (until the reaction is completed). Solids are filtered  
 25 off, and supernatant evaporated under vacuum to afford the product which is immediately used for the next step. Optionally, the synthesis is performed in dry N,N-dimethylformamide under inert atmosphere with sodium azide (5-10 mmol) or tetrabutylammonium azide (5-10 mmol), and the resulting solution of the crude 5-(S)-azidomethyloxazolidine-2-one is employed for the next step without solvent  
 30 removal.

5-(S)-Azidomethyl-3-(heteroaryl)oxazolidine-2-ones and Application  
Thereof for Preparation of 3-(Heteroaryl)oxazolidine-2-ones

An appropriate heteroarylchloride or heteroarylbromide (e.g. pyridyl, pyrimidyl, thienyl, thiazolyl, or thiadiazolyl halide; 5 mmol) is added to the solution of 5-(S)-azidomethyloxazolidine-2-one (ca. 5 mmol) in dry N,N-dimethylformamide (ca. 30-50 mL) at 0-20 °C (typically, at 10 -15 °C), followed by addition of a strong base (typically, sodium hydride, 5-15 mmol). The mixture is stirred at 20-120 °C for 2-24 h (typically, for 6 h at r.t.). Excess base is carefully quenched with acetic acid (to pH ca. 5-7), and most of the solvent is removed under vacuum. Water is added, and the mixture extracted with ethyl acetate. Combined organic layers are washed with water, 3% aq. citric acid, water, and the crude product purified by crystallization from appropriate solvents or by silica gel chromatography. Resulted 5-(S)-azidomethyl-3-(heteroaryl)oxazolidine-2-ones are immobilized on BAL resin just as described above for the synthesis of BAL resin immobilized 5-(S)-aminomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]oxazolidine-2-one, and the polymeric reagents thus obtained are used for synthesis of 3-(heteroaryl)oxazolidine-2-ones analogously to described above procedures for the synthesis of respective 3-(fluorophenyl)oxazolidinones.

5-(S)-Azidomethyl-3-[5'-methoxycarbonyl-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one

The compound is prepared according to above protocol for the synthesis of 5-(S)-azidomethyl-3-heteroaryloxazolidine-2-ones from 2-chloro-5-methoxycarbonyl-6-trifluoromethylpyrimidine (1 mmol) and 5-(S)-azidomethyloxazolidine-2-one (1.2 mmol) in N,N-dimethylformamide (5 mL). The reaction is performed with 60% sodium hydride in oil (3 mmol) at 15-20 °C for ca. 2 h. The crude product is purified by silica gel chromatography.

5-(S)-Azidomethyl-3-[5'-carboxy-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one

0.2 M Lithium or sodium hydroxide in a mixture of tetrahydrofuran - water (ca. 10 mL, 2 mmol) is added to 5-(S)-azidomethyl-3-[5'-methoxycarbonyl-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one (1 mmol), and the mixture

stirred at r.t. until the reaction is completed (by TLC analysis). Tetrahydrofuran is removed under vacuum, 3% aq. citric acid is added (to pH ca. 2-4), and the acid product is extracted with ethyl acetate. Organic layers are washed with water, brine, and dried (MgSO<sub>4</sub>). Solvent removed under vacuum and the crude product is purified by silica gel chromatography.

BAL Resin Immobilized 5-(S)-Aminomethyl-3-[5'-carboxy-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one and Its Application Its Preparation of 3-(Pyrimidyl)oxazolidine-2-ones.

Triphenylphosphine (3 mmol) is added to a mixture of BAL aldehyde resin (0.3 mmol) and 5-(S)-azidomethyl-3-[5'-hydroxy-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one (3 mmol) in tetrahydrofuran (10 mL) with bis(trimethylsilyl)acetamide (ca. 6 mmol) under nitrogen at r.t.. The mixture is agitated at room temperature for 2 h and then at 75 °C for 16 h. The mixture is cooled to room temperature, and 1M sodium cyanoborohydride in THF (6 mL, 6 mmol) is added in one portion. The reaction mixture is agitated for 6-8 h, resulted amine resin filtered, washed liberally with methanol and dichloromethane, and dried under vacuum. BAL resin immobilized 5-(S)-aminomethyl-3-[5'-carboxy-6'-trifluoromethylpyrimidine-2'-yl]oxazolidine-2-one thus obtained is further used for synthesis of 3-(pyrimidyl)oxazolidine-2-ones just as described above for the synthesis of respective 3-(fluorophenyl)oxazolidinones from BAL resin immobilized 5-(S)-aminomethyl-3-[4'-carboxy-3'-fluorophenyl]-oxazolidine-2-one.

3-(Pyridine-2-yl)oxazolidinone Derivatives

t-Butyl 6-chloronicotinate.

Thionyl chloride (25 mL) was added to 6-chloronicotinic acid (5.00 g, 0.0317 mol) containing 1 drop of N,N-dimethylformamide, and the mixture heated under reflux for 2 h. The solution was evaporated under vacuum, and residue thoroughly dried under vacuum. The acid chloride thus obtained was dissolved in tetrahydrofuran (50 mL), and 1 M lithium t-butoxide in tetrahydrofuran (66.6 mL, 0.0666 mol) added dropwise at r.t. The mixture was stirred overnight, diluted with water (100 mL) and extracted with ethyl acetate. The extract was washed with sat. aqueous NaHCO<sub>3</sub>, brine and dried (MgSO<sub>4</sub>).

Solvent was removed under vacuum to afford the pure ester as an off white solid.

Yield 6.23 g (92%). <sup>1</sup>H NMR. MS (m/z): 214 [M+H]<sup>+</sup>.

3-(t-Butoxycarbonyl)-6-[(R)-propane-1,2-diol-3-yl]aminopyridine

A mixture of t-butyl 6-chloronicotinate (4.69 g, 0.0220 mol) and (R)-3-amino-1,2-propanediol (5.00g, 0.0549 mol) in isopropanol (20 ml) was heated at 100 °C overnight. Solvent was removed under vacuum, and the residue taken up in ethyl acetate, washed with water, brine, dried (MgSO<sub>4</sub>), and evaporated to give nearly pure product as a yellow oil. Yield 5.90 g (99%). <sup>1</sup>H NMR. MS: 269 [M+H]<sup>+</sup>.

5-(R)-Hydroxymethyl-3-[3''-(t-butoxycarbonyl)pyridine-6''-yl]oxazolidine-2-one

Triethylamine (0.0518 mL, 0.558 mmol) was added to a solution of 3-(t-butoxy-carbonyl)-6-[(R)-propane-1,2-diol-3-yl]aminopyridine (0.100 g, 0.372 mmol) in dichloromethane (3 mL). The mixture was cooled in an ice bath, and 20% phosgene in toluene (0.236 mL, 0.446 mmol) was added dropwise with stirring. The reaction was allowed to warm to r.t. and stirred for at r.t. for 2 h. Water (3 mL) was added, and the organic layer separated, washed with brine and dried (MgSO<sub>4</sub>). Evaporation under vacuum afforded a white solid residue which was purified by flash column chromatography (eluent: ethyl acetate - hexanes 1:1). Yield 0.093 g (85%). <sup>1</sup>H NMR. MS (m/z): 295 [M+H]<sup>+</sup>.

5-(S)-Azidomethyl-3-[3''-(t-butoxycarbonyl)pyridine-6''-yl]oxazolidine-2-one

Methanesulfonyl chloride (1.38 mL, 0.0179 mol) was added dropwise with stirring to a solution of 5-(R)-hydroxymethyl-3-[3'-(t-butoxycarbonyl)pyridine-6''-yl]oxazolidine-2-one (5.00 g, 0.0170 mol) and triethylamine (3.55 mL, 0.0255 mol) in dichloromethane (50 mL) at 0 °C. The reaction mixture was allowed to warm to r.t. and then poured into water. The organic layer was separated, washed with water, sat. aq. NaHCO<sub>3</sub>, brine, and dried (MgSO<sub>4</sub>). Solvent was removed under vacuum to afford the mesylate intermediate. The intermediate thus obtained was heated with sodium azide (5.53 g, 0.085 mol) in N,N-dimethylformamide (ca. 40 mL) at 65 °C for 12 h. The reaction mixture was diluted with water (ca. 100 mL) and extracted with ethyl acetate. Organic layers was washed with water and

brine, and dried (MgSO<sub>4</sub>). The solvent was removed under vacuum and the residue purified by column chromatography (ethyl acetate - hexanes) to afford the pure product. Rt 5.0 min. <sup>1</sup>H NMR. MS (m/z): 320 [M+H]<sup>+</sup>.

5-(S)-(N-Acylaminomethyl)-3-[3''-[(un)substituted amino]carbonylpyridine-6''-yl]oxazolidine-2-ones

5-(S)-Azidomethyl-3-[3'-(t-butoxycarbonyl)pyridine-6''-yl]oxazolidine-2-one is immobilized on BAL-type resin with triphenylphosphine and sodium cyanoborohydride as described above for preparation of BAL resin immobilized 5-(S)-aminomethyl-3-[4'-*tert*-butoxycarbonyl-3'-fluorophenyl]-oxazolidine-2-one. The polymeric reagent thus obtained is deprotected as described for the preparation of BAL resin immobilized 5-(S)-aminomethyl-3-[4'-carboxy-3'-fluorophenyl]oxazolidine-2-one, and resulting BAL resin immobilized 5-(S)-(N-acylaminomethyl)-3-(3''-carboxypyridine-6''-yl)oxazolidine-2-one employed for the synthesis of 5-(S)-(N-acylaminomethyl)-3-[3''-[(un)substituted amino]carbonylpyridine-6''-yl]-oxazolidine-2-ones analogously to the Method A of the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-[(un)substituted amino]-carbonyl-3'-fluorophenyl]oxazolidine-2-ones 7.

BAL Resin Immobilized 5-(S)-(N-Acylaminomethyl)-3-[3''-(9'''-fluorenylmethoxycarbonyl)amino]pyridine-6''-yl]oxazolidine-2-ones and Application Thereof for Preparation of 3-(Pyridyl)oxazolidinones

The compound prepared from BAL resin immobilized 5-(S)-(N-acylaminomethyl)-3-(3''-carboxypyridine-6''-yl)oxazolidine-2-on as described above in the procedure for preparation of BAL resin immobilized 5-(S)-acetamidomethyl-3-[4'-(9'''-fluorenylmethoxycarbonyl)amino-3'-fluorophenyl]oxazolidine-2-one. The polymeric reagent thus obtained is further employed, e.g., for synthesis of respective 3''-acylated and 3''-sulfonylated 3-(pyridyl)oxazolidinones just as described above in the General Procedures for Preparation of 5-(S)-(N-Acylaminomethyl)-3-[4'-acylamino-3'-fluorophenyl]-oxazolidine-2-ones 5-(S)-(N-Acylaminomethyl)-3-[4'-sulfonamido-3'-fluorophenyl]oxazolidine-2-ones [except that resulting products incorporate 3-(pyridyl)oxazolidinone group instead of 3-(fluorophenyl)oxazolidinone group].

Preparation of immobilized epoxide (12a). To PNP resin (23a) (0.5 g, 0.77 mmol/g loading) at room temperature was added allylamine (125  $\mu$ L, 1.67 mmol) in 2mL of DMF. The resin was shaken overnight and then filtered. It was sequentially washed with DMF and DCM. After being dried *in vacuo*, the olefin resin (24a, 100 mg) was treated with *m*CPBA (80%, 72 mg, 0.355 mmol) in DCM for 16 hrs. The reaction mixture was filtered, and the resin was washed with DCM. Epoxide resin 12a was provided upon drying *in vacuo*. See Figure 25.

General method for the reaction of immobilized epoxide 5 with an amine.

To epoxide resin 12a at room temperature was added lithium triflate (LiOTf, 5 equivalents) and the amine (1 M in ACN, 10 equivalents). The mixture was shaken at room temperature for 15 hours, providing resin bound amino alcohol. The resin was filtered and sequentially washed with ACN and DMF. Treatment of the resin with TFA in DCM cleaved the amino alcohol. The reaction mixture was filtered and the resin washed with DCM. Concentration of the filtrate *in vacuo* provided the free amino alcohol.

Amino Alcohol Library. To an array of individual reaction chambers each containing particles or beads of epoxide resin 12a (25 mg) in ACN was added lithium triflate and an amine unit (0.5 mmol). The amine units of Table 2 were used. The array was shaken at room temperature for 15 hours, filtered and sequentially washed with ACN and DMF. The amino alcohol resin was cleaved upon treatment with TFA. The resin was filtered and washed with DCM. A plurality of amino alcohols was provided upon concentration of the filtrate array *in vacuo*.

General method for the preparation of oxazolidinones. To the resin bound amino alcohol 8a in DMF at room temperature was added N-methylmorpholine (NMM, 10 equivalents) and carbonyldiimidazole (CDI, 5 equivalents). The resin was shaken for 10 hrs, filtered and sequentially washed with DMF and DCM. Treatment of the resin with TFA in DCM for 0.5 hr cleaved the oxazolidinone. The resin was filtered and washed with DCM. The filtrate was concentrated *in vacuo* to yield an oxazolidinone amine residue 16a. Semi-preparative HPLC provided pure oxazolidinone amine.

Acetylation of Oxazolidinone Amine. To the crude oxazolidinone amine residue **16a** in DCM at room temperature was added pyridine (30 equivalents) and acetic anhydride (20 equivalents). The solution was stirred for 2 hrs and concentrated *in vacuo*. The oxazolidinone acetamide residue was purified by HPLC to provide pure oxazolidinone acetamide.

Oxazolidinone Library. To an array of individual reaction chambers each containing particles or beads of epoxide resin **12a** (25 mg) in CAN was added lithium triflate and an amine unit (0.5 mmol). The amine units of Table 2 were used. The array was shaken at room temperature for 15 hours, filtered and sequentially washed with CAN and DMF. To the array of amino alcohol resin was added NMM (10 equivalents) and CDI (5 equivalents). The array was shaken at room temperature for 10 hours, filtered and sequentially washed with DMF and DCM. The oxazolidinone resin was cleaved upon treatment with TFA. The resin was filtered and washed with DCM. The filtrate array was concentrated *in vacuo* and dissolved in DCM, and treated with pyridine (20 equivalents) and acetic anhydride (10 equivalents) for 30 min. A plurality of oxazolidinones was provided upon concentration of the solution array *in vacuo*.

Preparation of N-[(3-phenyl-2-oxo-5-oxazolidinyl)methyl]acetamide (**22a**).

To epoxide resin **12a** (100 mg) in ACN at room temperature was added LiOTf (50 mg, 0.32 mmol) followed by aniline (61  $\mu$ L, 0.66 mmol). After 16 hrs, the mixture was filtered and the resin sequentially washed with ACN and DMF. The resin (50 mg) in DMF (0.5 mL) was treated with CDI (27 mg, 0.17 mmol) and NMM (50  $\mu$ L) to provide resin bound oxazolidinone **20a**. The mixture was allowed to stand for 2 hours, after which the resin was filtered and sequentially washed with DMF and DCM. The resin was treated with TFA (90% in DCM, 1 mL) for 1h, filtered and washed with DCM. The filtrate was concentrated *in vacuo* to provide a residue (**21a**). The residue was treated for 1 h at 0 °C with triethylamine (18  $\mu$ L, 0.13 mmol) and acetyl chloride (10  $\mu$ L, 0.13 mmol). *In vacuo* concentration of the reaction mixture provided crude product, which was purified by semi-preparative HPLC to give oxazolidinone **22a** (3.6 mg).

### Direct preparation of oxazolidinone 20a.

To a solution of N-phenyl O-benzyl carbamate (152 mg, 0.67 mmol) in THF (2 mL) at -78 °C was added n-butyl lithium (1.5 M, 0.6 mL, 0.9 mmol). After stirring for 10 min, epoxide resin 12a (100 mg) was added to the reaction mixture. The mixture was allowed to warm to room temperature and stirred overnight. Saturated ammonium chloride solution was added to the reaction mixture. The resin was filtered and sequentially washed with water, DMF and DCM. A portion of the resin was treated with TFA (90% in DCM, 1 mL) to cleave the oxazolidinone, which was isolated upon *in vacuo* concentration.

### Preparation of N-[(3-(4-bromophenyl)-2-oxo-5-oxazolidinyl)methyl]-acetamide.

To epoxide resin 12a (300 mg) in ACN (2 mL) at room temperature was added LiOTf (219 mg, 1.41 mmol) followed by 4-bromoaniline (0.5 g, 2.9 mmol). The reaction mixture allowed to stand overnight. The resin was then filtered, washed sequentially with ACN, DMF and DCM and dried *in vacuo*. The resin (230 mg) was suspended in DMF (2 mL) at room temperature and treated with CDI (125 mg, 0.77 mmol) and NMM (84 µL, 0.77 mmol). After shaking overnight, the resin was filtered and sequentially washed with DMF and DCM. To a portion of the resin (20 mg) was added TFA (50% in DCM, 1 mL) at room temperature and the resulting mixture was stirred for 30 min. The resin was filtered and washed with DCM. The filtrate was concentrated *in vacuo* to provide a residue. Acetic anhydride (0.1 mL) and pyridine (0.1 mL) were added to the residue in DCM (2 mL). The mixture was concentrated and purified by semi-preparative HPLC to give N-[(3-(4-bromophenyl)-2-oxo-5-oxazolidinyl)methyl]-acetamide (2 mg, 41% theoretical yield). <sup>1</sup>H NMR.

### Preparation of N-[[3-(3-fluoro-4-morpholinyl)phenyl]-2-oxo-5-oxazolidinyl]-methyl]acetamide (28a).

To epoxide resin 5a (100 mg) in ACN (1.0 mL) at room temperature was added LiOTf (78 mg, 0.5 mmol) followed by 3-fluoro-4-morpholinylaniline (197 mg, 1.0 mmol). The reaction mixture was allowed to stir overnight. The resin was then filtered, sequentially washed with ACN, DMF and DCM and dried *in vacuo*. A portion of the resin (25a) was suspended in DMF (0.8 mL) and treated



with CDI (60 mg, 0.38 mmol) and NMM (100  $\mu$ L, 0.91 mmol). After shaking overnight, the resin was filtered and washed sequentially with DMF and DCM. To a portion of the resin (**26a**, 48 mg) was added TFA (90% in DCM, 1 mL) and the resulting mixture was allowed to stand for 1 h. The resin was filtered and washed with DCM. The filtrate was concentrated *in vacuo* to provide a residue. Acetyl chloride (12  $\mu$ L, 0.17 mmol) and triethylamine (37  $\mu$ L, 0.268 mmol) were added to the residue in DCM (2 mL) at 0 °C. The mixture was concentrated and purified by semi-preparative HPLC to give N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]methyl]-acetamide **28a** (1.8 mg, 15% theoretical yield). <sup>1</sup>H NMR.

Preparation of N-[[3-(4-fluoro-2-morpholinylphenyl)-2-oxo-5-oxazolidinyl]methyl]-acetamide. To epoxide resin **12a** (50 mg) in methanol (0.5 mL) was added 4-fluoro-2-morpholinylaniline (50 mg, 0.255 mmol). The reaction mixture was heated to 60 °C overnight and then allowed to cool to room temperature. The resin was filtered, sequentially washed with methanol and DCM and dried *in vacuo*. To the resin in DMF (0.5 mL) was added CDI (25 mg, 0.15 mmol) and NMM (50  $\mu$ L, 0.45 mmol). The reaction mixture was shaken for 4 hrs. The mixture was filtered, and the resin was sequentially washed with DMF and DCM. A portion of the resin (19 mg) was treated with TFA (90% in DCM, 1 mL) for 1h. The reaction mixture was filtered, and the resin was washed with DCM. The filtrate was concentrated to provide a residue. The residue was dissolved in DCM (2 mL) and treated with pyridine (100  $\mu$ L) and acetic anhydride (100  $\mu$ L) at room temperature for 1 h. The mixture was concentrated *in vacuo* and purified by semi-preparative HPLC to give N-[[3-(4-fluoro-2-morpholinylphenyl)-2-oxo-5-oxazolidinyl]methyl]acetamide (1.8 mg, 36% theoretical yield). <sup>1</sup>H NMR.

Attachment of Amine **32a** to a solid support. To dry Peg HS HCl resin (30 g, Perseptive Inc.) was added DIEA (30% in DCM, 150 mL). The mixture was stirred at room temperature for 30 min. The resin was filtered, sequentially washed with DCM, methanol and DCM and dried *in vacuo*. To 30 g. (18 mmol) of the resin in DMF (80 mL) were added Bal Linker **30a** (8.04 g, 1.7 eq.,

Perseptive Inc.), HATU (11.3 g, 1.6 eq.) and DIEA (18 mL, 3.5 eq.). The reaction mixture was allowed to stand overnight at room temperature. The mixture was filtered and the resin was sequentially washed with DMF, MeOH, DCM and TMOF. To the resin was added amine **32a** (18.2 g, 3 eq.) in 100 mL of TMOF. The mixture was stirred for 1 h, after which 50 mL of a NaBH<sub>3</sub>(CN)-THF solution (1 M) was added. The reaction mixture was stirred for 30 min., filtered and sequentially washed with methanol and DCM. *In vacuo* concentration of the filtrate afforded amine resin **33a**. Cleavage of a portion of the resin with TFA provided a 70% theoretical loading yield (0.6 mmol/g) of amine **32a**. <sup>1</sup>H NMR.

Preparation of amides derived from amine **33a**. To amine resin **33a** (25 mg) in DMF (1 mL) at room temperature was added a solution of carboxylic acid (0.5 mmol) and diisopropylcarbodiimide (0.25 mmol). After 16 hrs, the reaction mixture was filtered, and the resin **36a** was sequentially washed with DMF and DCM. The resin was treated with TFA (90% in DCM) to provide the free amide **37a**, which was obtained upon filtration and *in vacuo* concentration. HPLC and MS analysis of the amide residue showed that it was of greater than 80% purity.

Preparation of sulfonamides derived from amine **33a**.

To amine resin **33a** (25 mg) was added a solution of sulfonyl chloride (0.5 mmol) in DCM at room temperature. After standing for 16 hrs, the reaction mixture was filtered, and the resin was sequentially washed with DMF and DCM. The resin was treated with TFA (90% in DCM) to provide the free sulfonamide **35a**, which was obtained upon filtration and *in vacuo* concentration. HPLC and MS analysis of the amide residue showed that it was of greater than 80% purity.

Preparation of ureas derived from amine **33a**.

To amine resin **33a** (25 mg) was added a solution of isocyanate (0.5 mmol) in DCM at room temperature. After standing for 16 hrs, the reaction mixture was filtered, and the resin was sequentially washed with DMF and DCM. The resin was treated with TFA (90% in DCM) to provide the free urea **39a**, which was obtained upon filtration and *in vacuo* concentration. HPLC and MS analysis of the amide residue showed that it was of greater than 80% purity.

### Preparation of phenylsulfide derivatives from amine 33a.

To amine resin **33a** was added a solution of bromoacetic acid (3 eq.) and DIC (1.5 eq.) in DMF at room temperature. After 16 hrs, the reaction mixture was filtered to provide the bromoacetyl derivative **40a**. The resin was sequentially washed with DMF and DCM and dried *in vacuo*. To the resin (50 mg) in DMF was added potassium carbonate (50 mg) and thiophenol (0.5 mmol). The mixture was shaken overnight, filtered and sequentially washed with DMF, water, DMF and DCM. The resin was treated with TFA (90% in DCM) to afford the sulfide (5.0 mg, 40% theoretical yield).

### Method of Wittig Reaction from Acetyl Bromide 40a.

To the bromoacetyl resin (40, 50 mg) in DMF (1mL) was added triphenylphosphine (10 equivalents). After 16 hrs at room temperature, the resin was washed with DMF, and treated with potassium carbonate (20 equivalents) and benzaldehyde (10 equivalents) for 16 hrs at room temperature. The resin was washed with DMF, water, DMF and DCM, and cleaved with TFA (50% in DCM) to give (S)-N-[[3-(3-fluoro-4-morpholinylphenyl)-2-oxo-5-oxazolidinyl]methyl] cinnamamide (44): <sup>1</sup>H NMR (300 MHz) 7.62 (d, J=15.6 Hz, 1H) , 7.54-7.33 (m, 6H), 7.09 (d, J= 8.8 Hz, 1H), 6.94 (t, J = 9.2 Hz, 1H), 6.53 (d, J =15.6 Hz, 1H), 4.87-4.82 (m, 1H), 4.08 (t, J=9.0 Hz, 1 H), 3.86 (t, J=4.2 Hz, 4 H), 3.84-3.63 (m, 3H), 3.05 (t, J=4.2 Hz, 4H); MS (m/z) 426 (M<sup>+</sup>+1).

### Arylsulfide Library.

To an array of individual reaction chambers each containing particles or beads of bromoacetyl resin **40a** in DMF is added potassium carbonate and a thiol unit at room temperature. The thiol units designated in Table 1 are used. The array is shaken for 10 hrs, filtered and sequentially washed with DMF, water, DMF and DCM. The thio alcohol resin is cleaved upon treatment with TFA. The resin is filtered and washed with DCM. A plurality of sulfides is provided upon concentration of the filtrate array *in vacuo*.

### Preparation of an amide library derived from amine 33a.

To an array of individual reaction chambers each containing particles or beads of amine resin **33a** in DMF was added a solution of a carboxylic acid unit and diisopropylcarbodiimide. The carboxylic acid units designated in Table 4

were used. The array was shaken at room temperature for 16 hrs, filtered and sequentially washed with DMF and DCM. The amide resin was cleaved upon treatment with TFA. The resin was filtered and washed with DCM. A plurality of amides was provided upon concentration of the filtrate array *in vacuo*.

5           Preparation of a sulfonamide library derived from amine 33a.

To an array of individual reaction chambers each containing particles or beads of amine resin 33 in DCM was added a solution of a sulfonyl chloride unit. The sulfonyl chloride units designated in Table 3 were used. The array was allowed to stand for 16 hrs. It was then filtered and sequentially washed with DMF and DCM. The sulfonamide resin was cleaved upon treatment with TFA. The resin was filtered and washed with DCM. A plurality of sulfonamides was provided upon concentration of the filtrate array *in vacuo*.

10           Preparation of a urea library derived from amine 33a.

To an array of individual reaction chambers each containing particles or beads of amine resin 33a in DCM was added a solution of an isocyanate unit. The isocyanates of Table 3 were used. The array was allowed to stand for 16 hrs. It was then filtered and sequentially washed with DMF and DCM. The urea resin was cleaved upon treatment with TFA. The resin was filtered and washed with DCM. A plurality of ureas was provided upon concentration of the filtrate array *in vacuo*.

15           Preparation of an amide library using the amine units in Figure 30

To an array of individual reaction chambers each containing particles or beads of aldehyde functionalized resin 31a is added an amine subunit in TMOF. The subunits listed in Figure 30 are used. The mixture is stirred for 1 h, after which a NaBH<sub>3</sub>(CN)-THF solution is added. The reaction is stirred for 30 min., filtered and sequentially washed with methanol and DCM. *In vacuo* concentration of the filtrate affords the respective amine resins. The respective amine resin is placed in an array of individual reaction chambers. To the individual reaction chambers is added a solution of a carboxylic acid unit and diisopropylcarbodiimide. The carboxylic acid units designated in Table 4 are used. The array is shaken at room temperature for 16 hrs, filtered and sequentially washed with DMF and DCM. The amide resin is cleaved upon treatment with TFA. The resin

is filtered and washed with DCM. A plurality of amides is provided upon concentration of the filtrate array *in vacuo*.

Preparation of an amide library using the amine units in Figures 29, 30, and 31

To epoxide resin 7a (X = NH) in DMF is added a solution of a carboxylic acid unit and diisopropylcarbodiimide. The carboxylic acid units designated in Table 4 are used. After 3 hours, the resin is filtered, sequentially washed with DMF and DCM, and dried *in vacuo*. The respective resin is placed in an array of individual reaction chambers. To the resin in CAN in the individual reaction chambers is added LiOTf followed by an amine unit. The amine units shown in Figures 29, 30, and 31 are used. The array is shaken at room temperature for 15 hours, filtered and sequentially washed with CAN and DMF. To the array of amino alcohol resins is added NMM (10 equivalents) and CDI (5 equivalents). The array is shaken at room temperature for 10 hours, filtered and sequentially washed with DMF and DCM. The oxazolidinone resin is cleaved upon treatment with TFA. The resin is filtered and washed with DCM. A plurality of oxazolidinones is provided upon concentration of the solution array *in vacuo*. (The amines of Figures 29, 30, and 31 can be made according to procedures described in the following publications: U.S. Pat. No. 4,948,801; U.S. Pat. No. 4,705,799; U.S. Pat. No. 5,164,510; U.S. Pat. No. 4,975,538; U.S. Pat. No. 5,225,565; U.S. Pat. No. 5,182,403; U.S. Pat. No. 5,247,090; U.S. Pat. No. 5,231,188; U.S. Pat. No. 4,461,773; EP 0 785 201 A1; WO 97/19089; DE 196 01 265 A1; WO 97/27188; EP 0 789 026 A1; DE 196 01 264 A1; DE 196 04 223 A1; WO 97/30995; WO 97/09328; Van Delft *et al.* (1997) *Synthesis* 450-454; Wang *et al.* (1989) *Tetrahedron* 45:1323-1326; and Denis *et al.* (1994) *Bioorg. & Med. Chem. Lett.* 4:1925-1930; which are hereby incorporated by reference.)

Assay Protocol for  $\beta$ -Lactamase Inhibition. The lactamase (20-120 ng/mL) was incubated with a potential inhibitor with 1% DMSO in 50 mM potassium phosphate buffer, pH 7.0, with 0.005% Brij-35 for 30 min at room temperature. 100  $\mu$ M of nitrocefin was then added to the reaction mixture and the hydrolysis of the nitrocefin was monitored by measuring the absorption increase at 490 nm. Inhibition of the potential compounds was calculated by comparing

the rate of absorption increase with the control sample which containing the identical mixture except inhibitors. The IC<sub>50</sub>, was obtained by fitting the inhibition data into a standard 2-parameter IC<sub>50</sub> equation with a non-linear least-square fitting program (DeltaGraph).

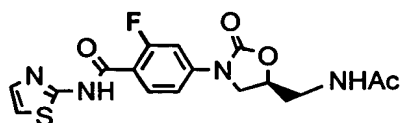
5                    Assay Protocol for Antimicrobial Activity. Minimum inhibitory concentrations (MICs) were determined using the microdilution method in 96-well format plates. Compounds were suspended in DMSO at 5 or 10 mg/ml and stored at 4°C until used. They were diluted in Mueller-Hinton Broth (MHB) or Trypticase Soy Broth (TSB) and used for MIC determination. The range of  
10 concentrations tested was 64-0.0625 µg/ml final concentration using a two-fold dilution system.

                  The inoculum was prepared from cells grown on Trypticase Soy Agar (TSA) and incubated overnight at 35 °C, 5 to 10 colonies were used to inoculate MHB or TSB broths, and the culture was incubated overnight at 35°C. The  
15 overnight culture was diluted 1:10, incubated for one hour at 35°C, diluted to the appropriate inoculum size and applied to the wells containing broth and test compound. Inoculum sizes were 1x10<sup>5</sup> to 5x10<sup>5</sup> CFU/ml. Strains used included *P. aeruginosa* VP AE1001, *E. faecium* V VEFA1001, *E. faecium* VanA VEFA1002, *S. aureus* VSAU1003, *S. aureus* MRSA VSAU1004, *E. coli* VEC05, and *E. coli* (arc-) VEC05.  
20

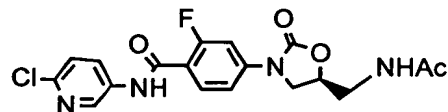
Plates were incubated at 35°C for 48 hours and MIC were recorded after 18 hours of incubation, for bacteria, and 48 for yeasts. MIC was defined as the lowest concentration of compound that does not produce visible growth after incubation.

25                    Antimicrobial Activity for Representative Compounds in Animals

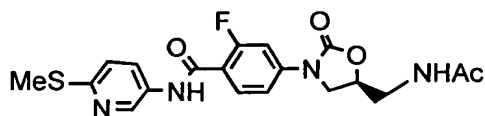
*In vivo* data was obtained for representative compounds i, ii, and iii to demonstrate the practical utility of the oxazolidinone compounds for treatment of a bacterial infection in animals.



i



ii



iii

5

CD1 female mice (Charles River Laboratories) weighing 18-22 grams were injected intraperitoneally with 0.2 ml of a suspension containing  $3 \times 10^7$  cfu of *S. aureus* (Smith strain) in 7% hog gastric mucosa (mucin). The mice were treated, either intravenously (i.v.) or orally (p.o.), 1 h and 5 h after infection. Five groups of six mice each were given different dosage levels representing two-fold dilutions of each compound (range of 25 mg/kg - 1.56 mg/kg). The compounds were all formulated in 40% aqueous hydroxypropyl-beta-cyclodextrin in PBS and untreated controls were dosed with vehicle alone.

10

15

Mortality in each group was monitored daily for 6 days and cumulative mortality was used to determine the 50% protective doses ( $PD_{50}$ ) which were calculated using the method of Reed and Muench [(a) Lorian, V. Antibiotics in laboratory medicine. Baltimore: Williams & Wilkins. 1996, p. 635-636; (b) Reed, L. J.; Muench H. A simple method of estimating fifty percent endpoints. Am. J. Hyg. 1938, 27, pp. 493-497] (Table 1). For animals receiving vehicle alone, there was a 79% mortality rate (19/24) in the p.o. dosing group and an 88% mortality rate (15/17) in the i.v. group; giving a total mortality rate for untreated controls of 83%.

20

25

$PD_{50}$  for above compounds was in a range 2.3-7.2 mg/kg for i.v. administration and 7.5-14.9 mg/kg for p.o. administration, with compound iii being the most preferred.

**Table 1: Thiols**

	2-mercaptobenzothiazole
	2-mercapto-4-methylpyrimidine HCl
	2-mercaptothiazoline
5	2-mercaptopyridine
	2-mercapto-(3H)-quinazoline
	2-mercapto-1-methyl imidazole
	5-(methylthio)-1,3,4-thiodiazole-2-thiol
10	2-mercapto-6-thien-2-yl-4-(trifluoromethyl)pyridine-3-carbonitrile
	thiazolo[4,5-b]pyridine-2-thiol
	4-(4-methoxyphenyl)pyrimidine-2-thiol
	2-mercapto-3-(trifluoromethyl)pyridine
	4,6-dimethyl-2-mercaptopyridine-3-carbonitrile
	4-trifluoromethylpyrimidine-2-thiol
15	ethyl 3-cyano-2-mercapto-6-methylpyridine-4-carboxylate
	2-mercapto-5-(trifluoromethyl)pyridine
	5-chloro-2-mercaptobenzothiazole
	4-methyl-4H-1,2,4-triazole-3-thiol
20	2,4,6-trimethylbenzylmercaptan
	2-quinolinethiol
	8-quinolinethiol HCl
	3-chloro-5-(trifluoromethyl)pyridine-2-thiol
	7-trifluoromethyl-4-quinidine-thiol
25	2,4,6,-trichlorobenzenethiol
	5-[3-(trifluoromethyl)benzylthio]-1,3,4-thiadiazole-2-thiol
	4-(4-chlorophenyl)pyrimidine
	thiomalic acid
	2,6-dichlorobenzenethiol
30	4-hydroxythiophenol
	5-(4,5-dichloroimidazole)
	3-mercaptopropionic acid
	3,4-dichlorobenzenethiol
	2,6,-dichlorobenzenethiol
35	2-methoxybenzenethiol
	2-bromothiophenol
	4-fluorothiophenol
	4-bromo-2-(trifluoromethoxy)benzenethiol
	3-(trifluoromethyl)benzenethiol
	thiolactic acid
40	3,4-dimethoxybenzenethiol
	4-methoxybenzenethiol
	2-(trifluoromethyl)benzenethiol
	4-(trifluoromethoxy)benzylthiol

**Table 2: Amines**

4-iodoaniline



	2-iodoaniline
	4-phenoxyaniline
	3-trifluoromethylamine
	m-anisidine
5	o-anisidine
	2-trifluoromethylaniline
	3-chloroaniline
	1,4-benzodioxane-6-amine
	5-aminoindan
10	3,4-(methylenedioxy)-aniline
	3-phenoxyaniline
	4-morpholinoaniline
	4-amino-1-benzyl-piperidine
	2-Bromoaniline
15	3-fluoroaniline
	4-trifluoromethoxyaniline
	4-methylmercaptoaniline
	3-bromoaniline
	2-fluoroaniline
20	4-fluoroaniline
	2,4-difluoroaniline
	3,4-difluoroaniline
	2,5-difluoroaniline
	1-amino-5,6,7,8,-tetrahydronapthalene
25	3,5-difluoroaniline
	3-fluorobenzylamine
	4-fluorobenzylamine
	4-aminoacetophenone
	4-aminobenzophenone
30	3-benzyloxyaniline
	1-(3-aminopropyl)imidazole
	4-(2-aminoethyl)-morpholine
	m-phenetidine
	3-chloro-4-fluoroaniline
35	2-bromo-5-(trifluoromethyl)aniline
	2-amino-3-benzyloxy pyridine
	2'-aminoacetophenone
	4-aminobenzoic acid
	4-aminobiphenyl
40	3'-aminocetophenone
	4-(3'-aminopropyl)morpholine
	aminopyrazine
	2-aminopyridine
	3-aminopyridine
45	4-aminopyridine
	6-aminoquinoline
	8-aminoquinoline

	4-aminoveratrole
	4-bromo-2,6-difluoroaniline
	4-bromo-2-fluoroaniline
	4-bromo-3-(trifluoromethyl)aniline
5	4-bromo-3-methylaniline
	2-bromo-4-fluoroaniline
	2-bromo-4-methylaniline
	3-bromo-4-methylaniline
	4-butoxyaniline
10	3-fluoro-4-methylaniline
	4-aminoquinaldine
	2-chloro-4,6-dimethylaniline
	2-chloro-4-aminotoluene
	2-chloro-4-fluoroaniline
15	4-chloroaniline
	2,4-dibromo-6-fluoroaniline
	2,4-dibromoaniline
	2,5-dibromoaniline
	2,4-dichloroaniline
20	2,5-dichloroaniline
	3,4-dichloroaniline
	3,5-dichloroaniline
	2,3-difluoroaniline
	N,N-dimethyl-1,4-phenylenediamine
25	5-fluoro-2-methylaniline
	2-fluoro-4-iodoaniline
	5-amino-2-methoxypyridine
	2-methylmercapto)-aniline
	sulfanilamide
30	sulfisomidine
	p-bromoaniline
	2-(4-aminophenyl)-6-methylbenzothiazole
	4-amino-4'-nitrodiphenyl sulfide
	3-aminophenol
35	4-aminophenol
	4'-aminoacetanilide
	3-aminobenzyl alcohol
	4-aminophenethyl alcohol
	2-aminoanthraquinone
40	6-aminonicotinamide
	2-amino--6-fluorobenzothiazole
	2-amino-5-(4-nitrophenylsulfone)thiazole
	2-amino-4-methoxybenzothiazole
	2-amino-4-chlorobenzothiazole
45	2-amino-5-bromothiazole HBr
	2-aminothiazole
	2-aminobenzothiazole

- |    |  |
|----|--|
|    | 2-amino-6-methoxybenzothiazole                             |
|    | 2-amino-6-nitrobenzothiazole                               |
|    | 2-amino-4-methylbenzothiazole                              |
|    | 2-amino-4-(4-chlorophenyl)thiazole                         |
| 5  | 2-amino-5,6-dimethylbenzothiazole                          |
|    | 2-amino-6-methylbenzothiazole                              |
|    | 2-amino-6-chlorobenzothiazole                              |
|    | 2-amino-6-ethoxybenzothiazole                              |
|    | 2-amino-5-nitrothiazole                                    |
| 10 | 2-amino-5-(ethylthio)-1,3,4-thiadiazole                    |
|    | methyl 3-amino-2-thiophene carboxylate                     |
|    | N-[4-(4-aminobenzyl)phenyl]-5-norbornene-2,3-dicarboximide |
|    | 2-amino-4-pheylthiazole HBr                                |
|    | 2-amino-3,5-dichloropyridine                               |
| 15 | 2-amino-5-bromo-pyridine                                   |
|    | 2-amino-4-picoline   |
|    | 5-amino-2-chloropyridine                                   |
|    | 2-amino-4,6-dimethylpyridine                               |
|    | 2-amino-5-chloropyridine                                   |
| 20 | 2-amino-2-chloropyridine                                   |
|    | 2-amino-5-picoline   |
|    | 2-amino-6-picoline   |
|    | 9-aminoacridine  |
|    | 5-aminoisoquinoline  |
| 25 | 3-aminoquinoline   |
|    | 2-amino-4,6-dimethylpyrimidine                             |
|    | 1-aminoisoquinoline  |
|    | 5-aminoquinoline   |
|    | 2-amino-4,6-dichloropyrimididine                           |
| 30 | 3-amino-5,6-dimethyl-1,2,4-triazine                        |
|    | 2-amino-4-chloro-6-methylpyrimidine                        |
|    | 2-amino-4-methylpyrimidine                                 |
|    | 5-amino-3-methylisothiazole                                |
|    | 2-amino-5-bromopyrimidine                                  |
| 35 | 2-amino-4,6-dimethoxypyrimidine                            |
|    | 2-amino-4-methoxy-6-pyrimidine                             |
|    | 4-amino-6-chloro-2-(methylthio)pyrimidine                  |
|    | 2-amino-5-chlorobenzoxazole                                |
|    | 2-amino-5-trifluoromethyl-1,3,4-thiadizole                 |
| 40 | 3-amino-5-methylisoxazole                                  |
|    | 4-amino-2,1,3-benzothiadiaazole                            |
|    | 2-amino-1,3,4-thiadiazole                                  |
|    | 3-amino-1-phenyl-2-pyrazolin-5-one                         |
|    | 6-amino-1,3-dimethyluracil                                 |
| 45 | 4-amino-1,2-naphthoquinone hemihydrate                     |
|    | 3-amino-1-(2,4,6-trichlorophenyl)-2-pyrazolin-5-one        |
|    | 1-(2-aminophenyl)pyrrole                                   |

	N-(4-amino-2-methylphenyl)-4-chlorophthalimide
	2-amino-3-chloro-5-(trifluoromethyl)pyridine
	2-amino-3-picoline
	2-amino-4-methyl-5-nitropyridine
5	2-amino-4-methylthiazole
	2-amino-5-ethyl-1,3,4-thiadiazole
	2-aminopyrimidine
	3-aminocrotononitrile
	3-amino-1,2,4-triazole
10	3-aminopyrazole
	4-amino-2,3,5,6-tetrafluoropyridine
	4-aminopyrimidine
	5-amino-1-ethylpyrazole
	5-amino-1-phenyl-4-pyrazolecarboxamide
15	5-amino-3-methylisoxazole
	5-aminouracile

### Table 3: Sulfonyl chlorides and Isocyanates

	p-toluenesulfonyl chloride
20	2,4-dichlorobenzenesulfonyl chloride
	2-thiophenesulfonyl chloride
	styrenesulfonyl chloride
	2-methoxycarbonylphenyl isocyanate
	4-acetylphenyl isocyanate
25	cyclohexyl isocyanate
	p-tolyl isocyanate

### Table 4: Carboxylic acids

	pyruvic acid
30	p-toluic acid
	o-tolylacetic acid
	phenylacetic acid
	trans-2-pentenoic acid
	methylthio acetic acid
35	4-methoxycinnamic acid
	nonanoic acid
	3-methoxypropionic acid
	4-methoxycyclohexanecarboxylic acid
	phenylpropionic acid
40	1-naphthylacetic acid
	pentafluoropropionic acid
	piperonylic acid
	N-(2-furoyl)glycine
	propionic acid
45	2,3,4,5,6-pentafluorophenylacetic acid

	4-pentenoic acid
	octanoic acid
	3-methoxyphenylacetic acid
	4-methylcinnamic acid
5	methacrylic acid
	p-(dimethylamino)cinnamic acid
	phenylpyruvic acid
	nicotinic acid
	2-methylcinnamic acid
10	methoxyacetic acid
	phenoxybenzoic acid
	phenoxyacetic acid
	cyclopropanecarboxylic acid
	glycolic acid
15	trans-3-hexenoic acid
	4- (trifluoromethyl)mandelic acid
	2-(2-methoxyethoxy)acetic acid
	diphenylacetic acid
	2-bromo-4,5-dimethoxycinnamic acid
20	3,4-dihydroxyhydrocinnamic acid
	3-methoxycinnamic acid
	4-chlorophenoxyacetic acid
	4-(4-nitrophenyl)butyric acid
	3-(4-chlorobenzoyl)propionic acid
25	2- (4-hydroxyphenoxy)propionic acid
	2-chlorocinnamic acid
	2-biphenylcarboxylic acid
	2-(4-chlorophenoxy)-2-methylpropionic acid
	benzoylpropionic acid
30	3-(phenylthio)acrylic acid
	3,5-di-tert-butyl-4-hydroxycinnamic acid
	4-bromobutyric acid
	4-bromomandelic acid
	decanoic acid
35	4-hydroxycinnamic acid
	2-nitrocinnamic acid
	2,3,4-trifluorocinnamic acid
	homovanillic acid
	3-methoxycyclohexanecarboxylic acid
40	2-ethoxycinnamic acid
	2,5-difluorophenylacetic acid
	4-fluorocinnamic acid
	2,6-difluorophenylacetic acid
	3,3-diphenylpropionic acid
45	cis-pinonic acid
	2-fluorobenzoic acid
	cyanoacetic acid

	1,2,3,4-tetrahydro-2-naphthoic acid
	trans-2-phenyl-1-cyclopropanecarboxylic acid
	4- (4-methoxyphenyl)butyric acid
	2-formylphenoxyacetic acid
5	3- (4-fluorobenzoyl)propionic acid
	difluoroacetic acid
	3-chlorobenzo[b]thiophene-2-carboxylic acid
	4-methoxybenzylidenecyanoacetic acid
	1-adamantaneacetic acid
10	1-adamantanecarboxylic acid
	1-fluorencarboxylic acid
	(2-naphthoxy)acetic acid
	1H-benzimidazole-5-carboxylic acid
	2- (2,4,5-trichlorophenoxy)propionic acid)
15	3-hydroxycinnamic acid
	abietic acid
	isoxazole-5-carboxylic acid
	(4-chloro-o-tolyloxy)-butyric acid
	3-pyridylacetic acid
20	alpha-methyl-2,4,5-trimethoxycinnamic acid
	2-chlorophenylacetic acid
	3-fluorophenylacetic acid
	(S)-(+)-mandelic acid
	2,4-difluorophenylacetic acid
25	butyric acid
	4-methoxyphenylacetic acid
	4-ethoxyphenylacetic acid
	trans-2-hexenoic acid
	3,4-dihydroxycinnamic acid
30	2,3-dichlorophenoxyacetic acid
	S-benzylthioglycolic acid
	3,4-(methylenedioxy)phenylacetic acid
	(alpha, alpha, alpha-trifluoro-m-tolyl) acetic acid
	3,4-difluorophenylacetic acid
35	2-furioic acid
	4-acetylphenoxyacetic acid
	4-(3,4-dimethoxyphenyl)butyric acid
	cyclohexanepropionic acid
	7-methoxy-2-benzofuran carboxylic acid
40	2- (trifluoromethyl)cinnamic acid
	2,4-dinitrophenylacetic acid
	2,4-dichlorophenylacetic acid
	2-nitrophenylpyruvic acid
	iodoacetic acid
45	acetic acid
	4- (2,4-dichlorophenoxy)-butyric acid
	3-(3,4,5-trimethoxyphenyl)propionic acid

- 6-chloro-2H-1-benzopyran-3-carboxylic acid  
 4-acetamidocinnamic acid  
 3-hydroxyphenylacetic acid  
 2-chloro-6-fluorocinnamic acid  
 5 3-fluoro-4-hydroxyphenylacetic acid  
 4-fluorophenylacetic acid  
 trans-3-fluorocinnamic acid  
 3-bromocinnamic acid  
 2-pyridylacetic acid  
 10 alpha-fluorocinnamic acid  
 4-(2-cyclohexenyloxy)benzoic acid  
 1-naphthoic acid  
 2-bromophenylacetic acid  
 4-nitrocinnamic acid  
 15 2-propylpentanoic acid  
 3,4-dihydro-2,2-dimethyl-4-oxo-2h-pyran-6-carboxylic acid  
 3-(2-methoxyphenyl)propionic acid  
 2-fluorocinnamic acid  
 tiglic acid  
 20 (4-pyridylthio)acetic acid  
 4-hydroxyphenylacetic acid  
 4-bromophenylacetic acid  
 chloroacetic acid  
 chromone-2-carboxylic acid  
 25 4-bromocinnamic acid  
 alpha-phenyl-cinnamic acid  
 benzoylformic acid  
 dichloroacetic acid  
 3,5-dimethoxy-4-hydroxycinnamic acid  
 30 trans-4-(trifluoromethyl) cinnamic acid  
 cyclohexylacetic acid  
 cyclopentylpropionic acid  
 (-)-mentoxyacetic acid  
 alpha-fluorophenylacetic acid  
 35 3-(3,4-dimethoxyphenyl)propionic acid  
 3,4-dichlorocinnamic acid  
 4-fluorophenoxyacetic acid  
 thiophenoxyacetic acid  
 3,5-bis(trifluoromethyl)phenylacetic acid  
 40 (4-methylphenoxy)acetic acid  
 6-methylchromone-2-carboxylic acid  
 (3,4-dimethoxyphenyl)acetic acid  
 3-chlorophenylacetic acid  
 2,3,4,5,6-pentafluorocinnamic acid  
 45 3-indolepropionic acid  
 2-thiopheneacetic acid  
 6-bromocoumarin-3-carboxylic acid

	4-pyridylacetic acid
	alpha-methylhydrocinnamic acid
	alpha-phenylcinnamic acid
	cis-2-methoxycinnamic acid
5	4-phenylcinnamic acid
	4-chloro-o-anisic acid
	4-ethoxycinnamic acid
	2-phenylpropionic acid
	3,4-(methylenedioxy)cinnamic acid
10	1-phenyl-1-cyclopropanecarboxylic acid
	3-cyanobenzoic acid
	3,4,5-trimethoxyphenylacetic acid
	(2-amino-thiazole-4-yl)acetic acid
	2,3-dimethoxybenzoic acid
15	4-chlorophenylacetic acid
	bis(4-chlorophenoxy)acetic acid
	tetrahydro-2-furoic acid
	trans-styrylacetic acid
	4-chlorocinnamic acid
20	alpha-methylcinnamic acid
	alpha-cyanocinnamic acid
	4-methylvaleric acid
	4-pyrazolecarboxylic acid
	2-fluorophenylacetic acid
25	3-(1-naphthyl)acrylic acid
	3-bromophenylacetic acid
	alpha-cyano-3-hydroxycinnamic acid
	2-(3-chlorophenoxy)propionic acid
	2,5-dimethylcinnamic acid
30	2,6-dichlorophenylacetic acid
	3-phenoxypropionic acid
	2,6-dichlorocinnamic acid
	(2,5-dimethoxyphenyl)acetic acid
	2,3,4-trimethoxycinnamic acid
35	2,3,4-trimethoxybenzoic acid
	2-chlorobenzoic acid
	3,4,5-trimethoxycinnamic acid
	cyclobutanecarboxylic acid
	cyclohexene-1-carboxylic acid
40	4-nitrophenylacetic acid
	benzoylbutyric acid
	3,5-dimethoxybenzoic acid
	alpha-cyano-4-hydroxycinnamic acid
	cyclopentanecarboxylic acid
45	5-(pyrid-2-yl)thiophene-2-carboxylic acid
	bromoacetic acid
	trans-4-hydroxy-3-methoxycinnamic acid



- 09641396-081700
- 4-chloro-2-fluorocinnamic acid
  - 2-octynoic acid
  - 3-(p-tolyl)propionic acid
  - 4-chlorobenzoic acid
  - 5 2-methoxyphenylacetic acid
  - 4-biphenylcarboxylic acid
  - 2-chloro-4-fluorocinnamic acid
  - 2-norborneneacetic acid
  - 2-naphthylacetic acid
  - 10 2-methyl-1-cyclohexanecarboxylic acid
  - (1-naphthoxy)acetic acid
  - 2,5-dimethoxybenzoic acid
  - cyclopentylacetic acid
  - ethoxyacetic acid
  - 15 cyclohexanebutyric acid
  - 2-methylcyclopropane-carboxylic acid
  - 4-methylcyclohexaneacetic acid
  - 4-hydroxymandelic acid monhydrate
  - 4-bromo-2-fluorocinnamic acid
  - 20 lauric acid
  - 2-bromovaleric acid
  - 2,6-dimethoxybenzoic acid
  - trans-2,3-dimethoxycinnamic acid
  - 3-(4-hydroxyphenyl)propionic acid
  - 25 3-(4-methoxybenzoyl)-propionic acid
  - (alpha, alpha,alpha-tri-fluoro-p-tolyl)acetic acid
  - hydrocinnamic acid
  - 3,4-difluorocinnamic acid
  - 3,5-bis(trifluoromethyl)benzoic acid
  - 30 (3,5-dimethoxyphenyl)acetic acid
  - 9-anthracenecarboxylic acid
  - 3-(trifluoromethyl)cinnamic acid
  - m-tolylacetic acid
  - 4-formylcinnamic acid
  - 35 3-furic acid
  - crotonic acid
  - alpha-acetamidocinnamic acid
  - alpha-phenylcyclopentaneacetic acid
  - diphenylacetic acid
  - 40 4,5-dimethoxy-2-nitrocinnamic acid
  - 4-(methylthio)phenylacetic acid
  - 3,5-dimethoxycinnamic acid
  - 3-nitrocinnamic acid
  - 5-chlorobenzo[b]thiophene-3-acetic acid
  - 45 3-methyl-2-phenylvaleric acid
  - 3-(trifluoromethoxy)cinnamic acid
  - 4-biphenylacetic acid

- 3-bromo-4-fluorocinnamic acid  
 3-(2-hydroxyphenyl)propionic acid  
 2,4-difluorocinnamic acid  
 5-methoxy-1-indanone-3-acetic acid  
 5 alpha-methoxyphenylacetic acid  
 2-thiophenecarboxylic acid  
 3-(4-methoxyphenyl)propionic acid  
 4-acetoxy-3-methoxycinnamic acid  
 2-methoxycinnamic acid  
 10 3-benzoylbenzoic acid  
 levulinic acid  
 3,4-dichlorophenylacetic acid  
 3-methylindene-2-carboxylic acid  
 4-phenoxybutyric acid  
 15 2-hydroxycinnamic acid  
 2-ethoxy-1-naphthoic acid  
 2-chloro-5-nitrocinnamic acid  
 3,3-dimethylacrylic acid  
 4-pentynoic acid  
 20 4-acetoxycinnamic acid  
 2-(p-toluoyl)-benzoic acid  
 3,5-difluorocinnamic acid  
 2-ethoxybenzoic acid  
 trans-2-methyl-2-pentenoic acid  
 25 cycloheptanecarboxylic acid  
 tetrahydro-3-furoic acid  
 3,5-difluorophenylacetic acid  
 trans-2,6-difluorocinnamic acid  
 thioctic acid  
 30 5-bromo-2-fluorocinnamic acid  
 11-phenoxyundecanoic acid 2,4 -dichlorophenoxyacetic acid  
 2- (2,4-dichlorophenoxy)-propionic acid  
 2,2-dimethylbutyric acid  
 o-tolulic acid  
 35 2-bromo(4,5-(methylenedioxy)cinnamic acid  
 alpha-bromophenylacetic acid  
 trans-N-(2-furfurylideneacetyl)-glycine 3-chlorobenzoic acid  
 D-3-phenyllactic acid  
 2-phenoxybutyric acid  
 40 2- (4-chlorophenoxy)propionic acid  
 2-acetoxycinnamic acid  
 (R)-(-)-mandelic acid  
 (+)-6-methoxy-alpha-methyl-2-naphthaleneacetic acid  
 (+)-2-(2-chlorophenoxy)propionic acid  
 45 (+/-) 2-phenoxypropionic acid  
 1-methyl-1-cyclohexanecarboxylic acid  
 2,5-dimethoxycinnamic acid

2-(2-aminothiazole-4-yl-2-methoxyiminoacetic acid  
2-acetamidoacrylic acid

5           Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity and understanding, it will be apparent to those skilled in the art that certain changes and modifications may be practical. Therefore, the description and examples should not be construed as limiting the scope of the invention.

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